FILE NO.

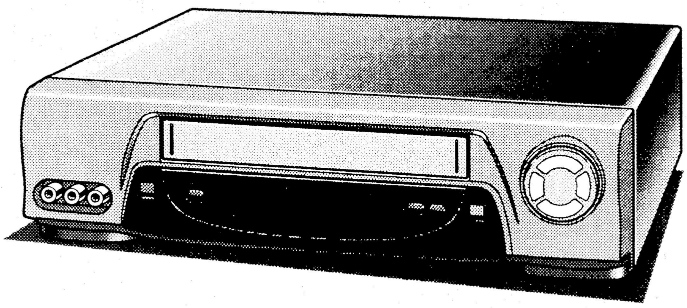
universum.

SERVICE MANUAL
Inkl. Mechanism

Video Cassette Recorder

VR 2780

VR 2781



(VR 2781)

VHS
PAL

CONTENTS

SELF-DIAGNOSIS DISPLAY 2
1. DISASSEMBLY 5
2. ELECTRICAL ADJUSTMENT 9
3. TEST POINTS FOR TAPE PATH ADJUSTMENT 13
4. PARTS LIST
   MECHANISM PARTS 14
   ACCESSORIES 16
   PACKING MATERIALS 16
   CABINET & CHASSIS PARTS 16
   ELECTRICAL PARTS 17
CIRCUIT DIAGRAMS (Refer to the separate volume)

Please see other materials with Reference number given in table below.

Materials	Model No.	Reference No.
Mechanism Manual	V95 II Mechanism	MM531616

PRODUCT SAFETY NOTICE

The components designated by a symbol (⚠) in this schematic diagram designates components whose value are of special significance to product safety. Should any component designated by a symbol need to be replaced, use only the part designated in the parts List. Do not deviate from the resistance, wattage, and voltage ratings shown.

NOTE: 1. Parts order must contain model number, part number, and description.
2. Substitute parts may be supplied as the service parts.
3. N.S.P. : Not available as service parts.

Design and specifications are subject to change without notice.

MP4HN/GQU3, GQU2

REFERENCE No.SM531617

SELF-DIAGNOSIS DISPLAY

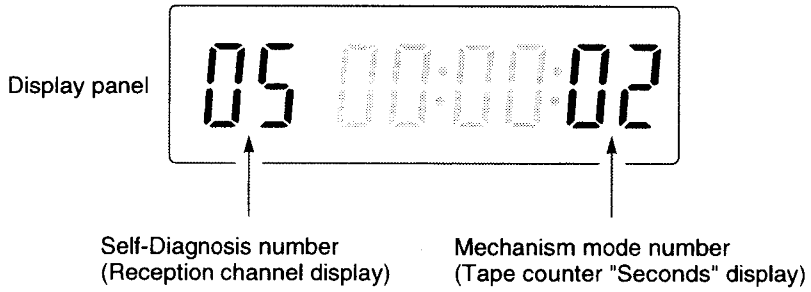
Mechanism Mode Display / Head Output Drop Warning Display / Cylinder Rotation Accumulated Time Display

This unit displays the diagnosis contents of abnormalities and the mechanism, mode on its display panel in 2-digit numbers. When the head playback output has dropped, the "L" sign will be blinked. Some models (listed later) will also display the cylinder rotation accumulated time.

These display shows the outline of the problems. Use it as a reference when servicing the unit.

1. Self-Diagnosis Contentes and Mechanism Mode Display

- When the STOP button on the remote control is pressed for about 10 seconds continuously, the self-diagnosis number will be displayed on the reception channel display of the display panel and number indicating the failed mechanism mode (changed mode when being shifted) on the tape counter "seconds" display for 10 seconds each.
- During self-diagnosis display, displays other than the diagnosis number/mechanism mode number and the cylinder accumulated rotation time display described later (some models only) will be turned off and when displays end, the normal display will be returned automatically.
- Refer to "Self-Diagnosis Contents" for the self-diagnosis numbers and the "Mechanism Mode Display Contents" for the mechanism mode numbers.
- When the "0" button on the remote control unit is pressed during display, and clearing the self-diagnosis display and mechanism mode display.



Self-Diagnosis Contents

No.	Problem	Main Possible Cause	Mechanism Operations and State After Occurrence
00	There is no abnormality in the mechanism.		
01	The cylinder motor does not rotate.	• The cylinder motor is faulty. • The control of the cylinder motor is faulty. • The tape winds around the cylinder.	Shifts to the STOP mode.
02	The take-up reel does not rotate.	• The take-up reel is caught. • The reel belt is faulty. • The take-up torque has decreased.	Shifts to the STOP mode.
03	The capstan motor does not rotate.	• The capstan motor is faulty. • The control of the capstan motor is faulty.	Shifts to the STOP mode.
04	The tape cannot be loaded with the cassette inserted. (But unloading can be performed.)	• Error in the operations of the tape loading mechanism. • Foreign particles in the tape loading mechanism. • The tape end sensor is faulty. • The reel brake of the tape cassette has not been released.	Unloads, shifts to the INITIAL mode, and the power goes off.
05	Tape loading and unloading cannot be performed with the cassette inserted.	• The tape guide is caught. • The loading motor is faulty. • The control of the loading motor is faulty.	The power is forcibly turned off with the mechanism at its current position.

No.	Problem	Main Possible Cause	Mechanism Operations and State After Occurrence
06	Front unloading cannot be performed when ejecting the cassette. (Front loading can be performed.)	• The cassette drive mechanism is faulty. • The tront door is caught.	Front loads and shifts to the STOP or INITIAL mode. • When the power switch is turned on before eject operations: Shifts to the STOP mode. • When the power switch is turned off before eject operations: Shifts to the INITIAL mode and the power goes off.
07	Front loading and front unloading cannot be performed when ejecting the cassette.	• The tape cassette is caught in the cassette drive mechanism. • The main cam and front rack gear of the front loading mechanism have not engaged properly. • The gears of the front loading drive mechanism have not engaged properly.	The power is forcibly turned off with the mechanism at its current position.
08	The mechanism becomes 1 (REVIEW) while moving from 2 (IDLER), 3 (STILL), 4 (BRAKE), and to 5 (STOP).	• The mechanism mode switch contact is faulty.	The power is forcibly turned off with the mechanism at its current position.
09	The mechanism becomes 7 (INITIAL) while moving from 1 (REVIEW), 2 (IDLER), 3 (STILL), 4 (BRAKE), and to 5 (STOP).	• The mechanism mode switch contact is faulty.	Carries out tape take-up operations, shifts to the INITIAL mode, and the power goes off.

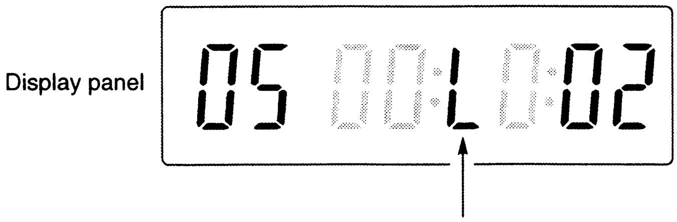
Note: For details of mechanism operations corresponding to the mechanism positions of the self-diagnosis numbers 08 and 09 above, refer to the separate volume on the V95 I mechanism manual. These manual reference numbers are shown in the cover.

Mechanism Mode Display Contents

Mode No.	Mechanism Mode	Mode No.	Mechanism Mode	Mode No.	Mechanism Mode
00	CASSETTE OUT	**08**	PLAY	**16**	VIDEO INSERT
01	STANDBY	**09**	REC	**17**	VIDEO INSERT-PAUSE
02	STOP	**10**	AUDIO DUBBING	**18**	AUDIO/VIDEO INSERT
03	STILL	**11**	X2 SPEED PLAY	**19**	REVERSE X2 SPEED PLAY
04	REC-PAUSE	**12**	CUE		
05	AUDIO DUBBING-PAUSE	**13**	REVIEW		
06	FRAME ADVANCE	**14**	FAST FORWARD		
07	SLOW	**15**	REWIND	**99**	OTHERS

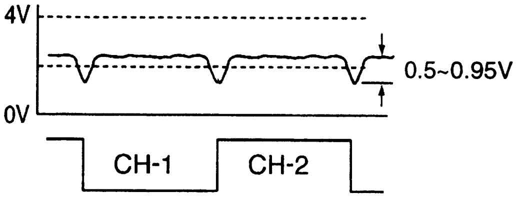
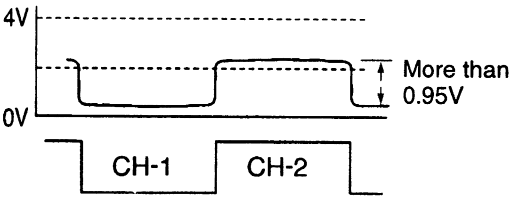
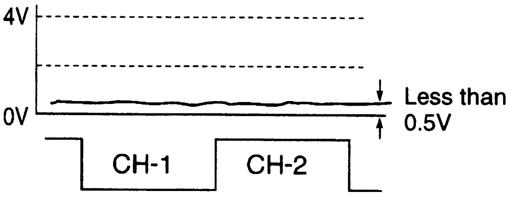
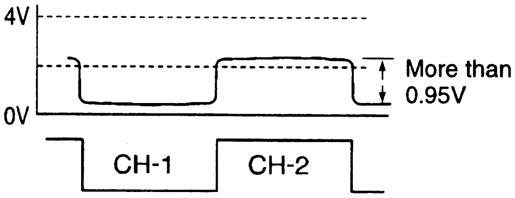
2. Head Output Drop Warning Display

- When the STOP button on the remote control is pressed for 10 seconds continuously 10 seconds after play starts, "L" will be displayed blinking at the first digit of the minutes position on the tape counter when the head output is lower than the specified value to indicate an abnormality.
- The cause of the abnormality may be due to drop in the playback output caused by drop in the efficiency of the cassette used or head clogging. Refer to "Head Playback Output Voltage Check" as a means to judge the abnormality.



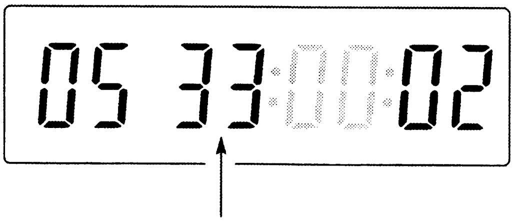
Head output drop warning display
(Tape counter "1st digit of Minutes." position)

Head playback output voltage check

Cassette Used	Warning Display	Envelope Detection Output Voltage	Main Cause
Cassette with normal playback output	–	Envelope detection output (IC301 Pin 25 or R3032 Mark side: see Fig. 2-1-1) Switching pulse (TP183: see Fig. 2-1-2) 	When the output voltage difference of the two channels is 0.5 to 0.95V • The video heads of both are normal
Recorded cassette (with tabs)	"L" blinking	Envelope detection output (IC301 Pin 25 or R3032 Mark side: see Fig. 2-1-1) Switching pulse (TP183: see Fig. 2-1-2) 	When the output voltage difference of the two channels is more than 0.95V • Tracking adjustment has not been performed accurately • One video head is clogged • One video head has worn out
	"L" blinking	Envelope detection output (IC301 Pin 25 or R3032 Mark side: see Fig. 2-1-1) Switching pulse (TP183: see Fig. 2-1-2) 	When the average output voltage of the two channels is less than 0.5V • Tracking adjustment has not been performed accurately • Both video heads are clogged • Both video heads have worn out
Rental cassette (without tabs)	"L" blinking	Envelope detection output (IC301 Pin 25 or R3032 Mark side: see Fig. 2-1-1) Switching pulse (TP183: see Fig. 2-1-2) 	When the output voltage difference of the two channels is more than 0.95V • Tracking adjustment has not been performed accurately • One video head is clogged • One video head has worn out
	• Some rental cassettes may have extremely low video playback outputs even when both video heads are normal. As the average output voltage of the two heads may be less than 0.5V for some, no warning displays will be shown.		

3. Cylinder rotation accumulated time display

- Press the STOP button on the remote control for approximately 10 seconds and the cylinder rotation accumulated time excluding the cassette out and standby operation time will be displayed on the "Hours" display in units of 100 hours. ("33" will be displayed for 10 seconds for 3,200 to 3,299 hours.)
- To erase the cylinder rotation accumulated time display, press the RESET button on the remote control during the accumulated time display.



Cylinder rotation accumulated display (Tape counter "Hours" display)

1. DISASSEMBLY

1-1. REMOVAL OF CABINET, MECHANISM UNIT, AND MAIN BOARD

REMOVING THE CABINET PARTS (Fig. 1-1-1)

1. Remove the cabinet and bottom cover by removing the four screws ① and four screws ②.
2. Remove the front panel by removing the locks of the clamps (A) using a screwdriver, etc. and slightly rotating the bottom part in the direction of the arrow.

Notes:
- Electrical adjustments for the this model can be performed with only the cabinet removed.
- When replacing the bottom cover, do not tighten the screws ② too much. Excess tightness may damage the screws taps on the chassis.

REMOVING THE MECHANISM MAIN UNIT AND THE CP-1 PWB ASSEMBLY (Fig. 1-1-2 and 1-1-3)

After removing the cabinet parts, remove the mechanism unit and the CP-1 PWB assembly connected as follows.

1. Spread out the lock clamps (C) in the arrow direction slightly and remove the TM-1 PWB as shown in Fig. 1-1-2.
2. Remove the screw ④ at the chassis.
3. Remove the screw ⑤ in the chassis, the screw ⑥, and the holder in this order.
4. Remove the two screws ⑦ and two screws ⑧ of the mechanism unit. The two screws ⑧ of the cassette tray can be removed easily by pushing the tray lock lever in the arrow direction to remove the lock as shown in the enlarge view A and by pushing the lid opener lever in the arrow direction to remove the lock as shown in the enlarge view B.
5. Lift up the whole mechanism unit and main board (CP-1 PWB assembly), and as shown in Fig. 1-1-3, push the two lock clamps (D) of the chassis in the arrow direction so that they can be removed from the chassis.

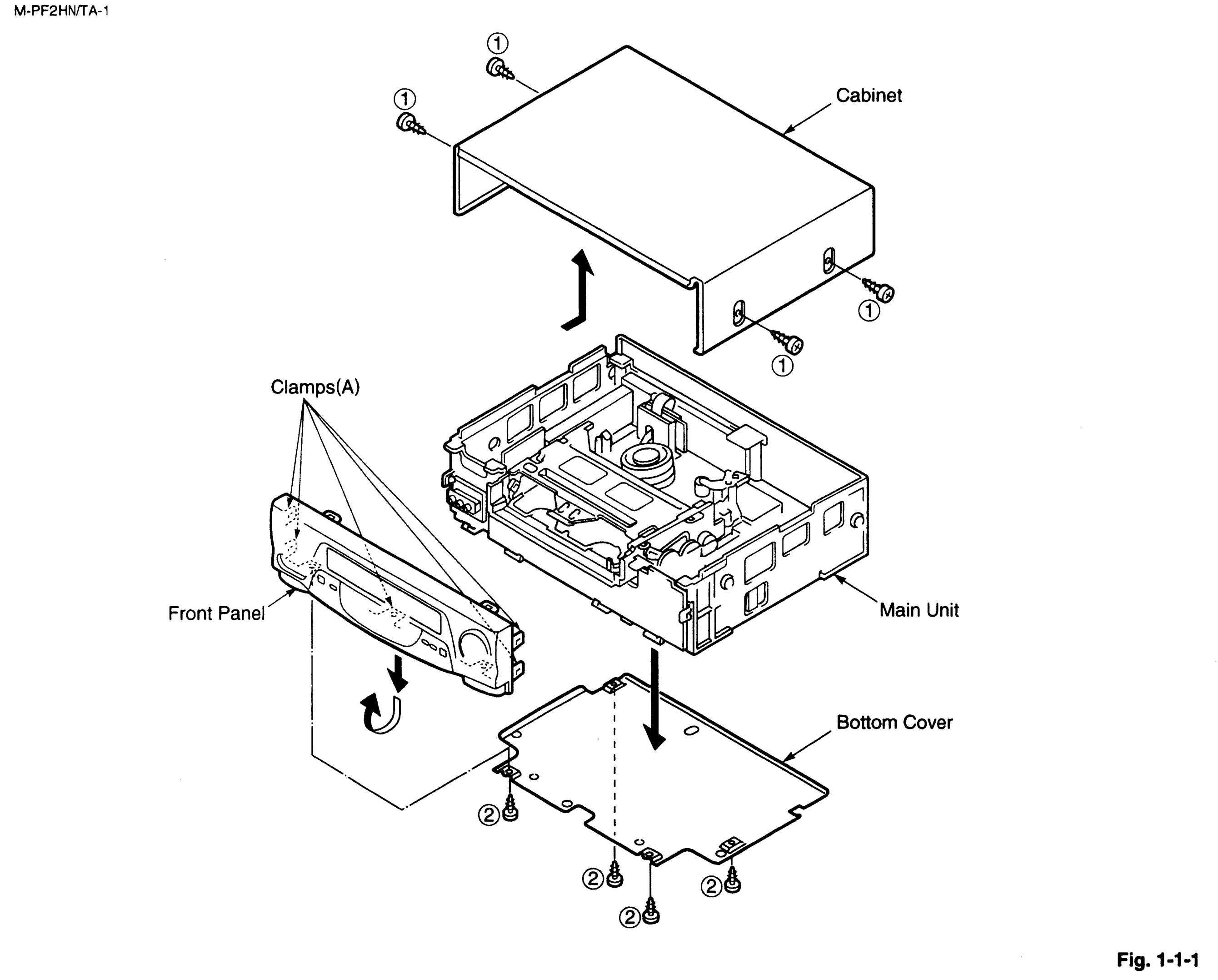


Fig. 1-1-1

M-PF2HN/TA-2

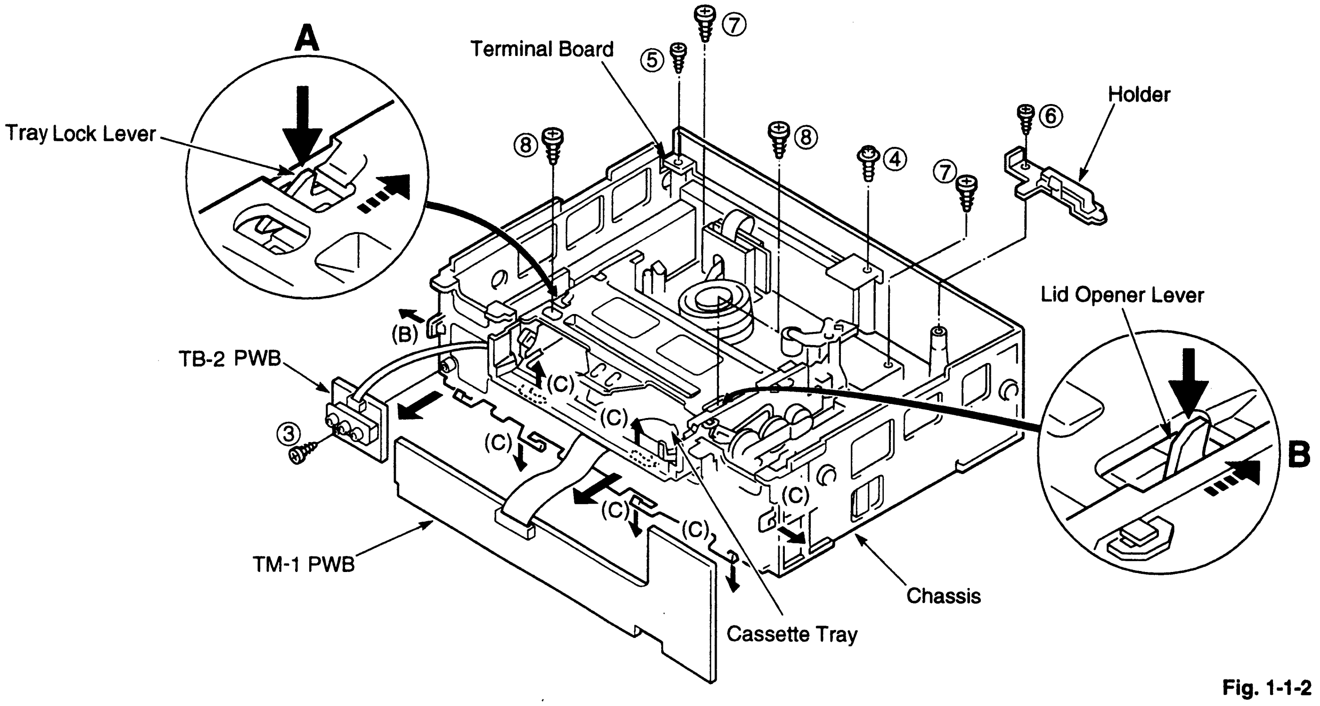

A
Tray Lock Lever
Terminal Board
⑦
⑤
⑧
⑧
④
⑦
⑥
Holder
Lid Opener Lever
B
(B)
TB-2 PWB
③
(C)
(C)
(C)
(C)
(C)
(C)
TM-1 PWB
Chassis
Cassette Tray

Fig. 1-1-2

M-PF2HN/TA-3

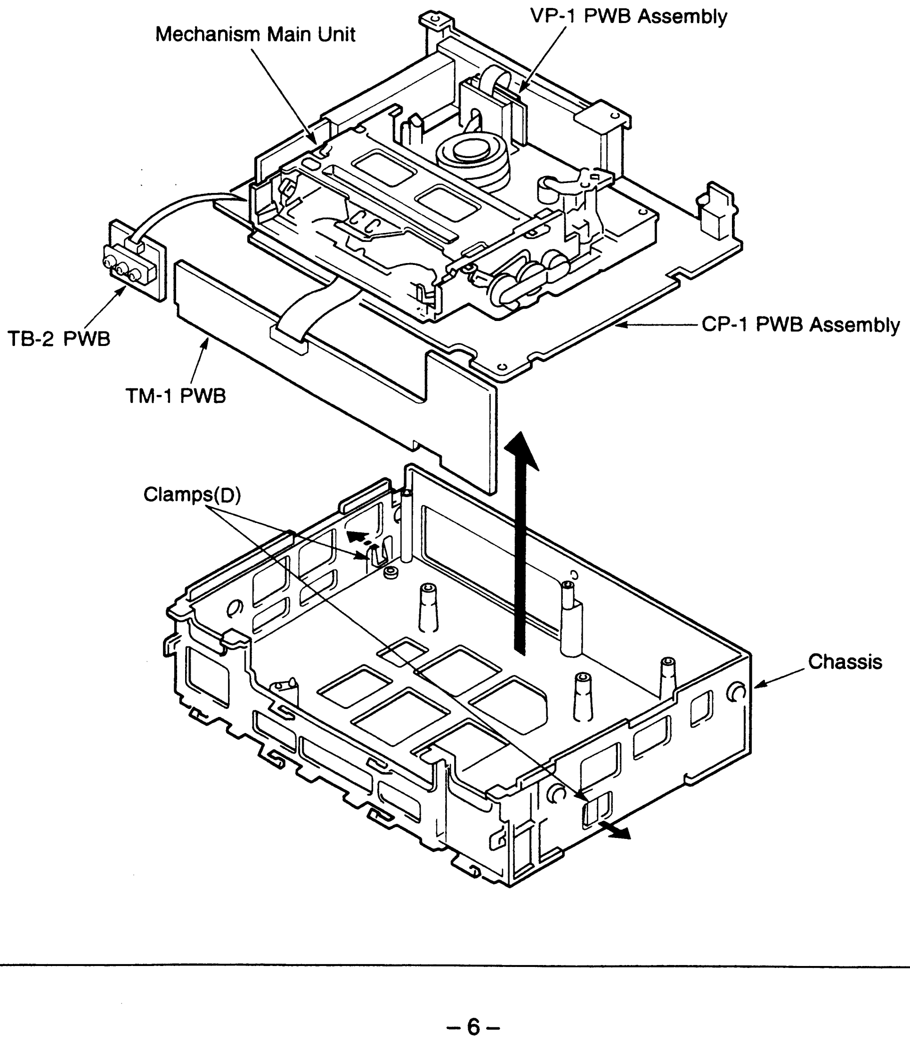

Mechanism Main Unit
VP-1 PWB Assembly
TB-2 PWB
TM-1 PWB
CP-1 PWB Assembly
Clamps(D)
Chassis

Fig. 1-1-3

1-2. TEMPORARILY SETTING UP AND CONNECTING CP-1 PWB ASSEMBLY

The following is an example of how to place and connect the main board without a jig, when repairing the CP-1 PWB assembly.

1. Place the mechanism unit and main board up side down as a whole on a flat surface with foil side of the main board facing up.
2. Operete the unit using the buttons on TM-1 PWB or the remote control.

M-PF2HN/TA-4

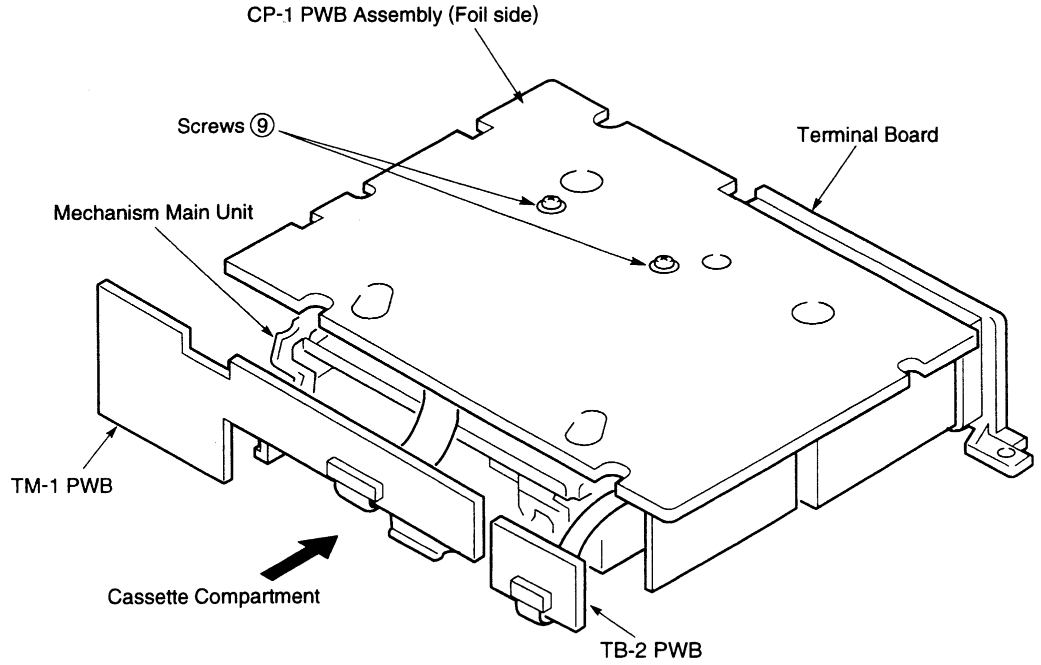

CP-1 PWB Assembly (Foil side)
Screws ⑨
Terminal Board
Mechanism Main Unit
TM-1 PWB
Cassette Compartment
TB-2 PWB

Fig. 1-1-4

1-3. INSTALLATION OF THE FRONT PANEL

When installing the front panel to the chassis after repaires and adjustments.

1. Pressing down the door opener lever of the mechanism main unit.
2. Set the cassette door to half-opened state as shown in Fig. 1-1-5, and install the front panel to the chassis.

Note: Opened cassette door position does not install the front panel to the chassis.

M-PF2HN/TA-5

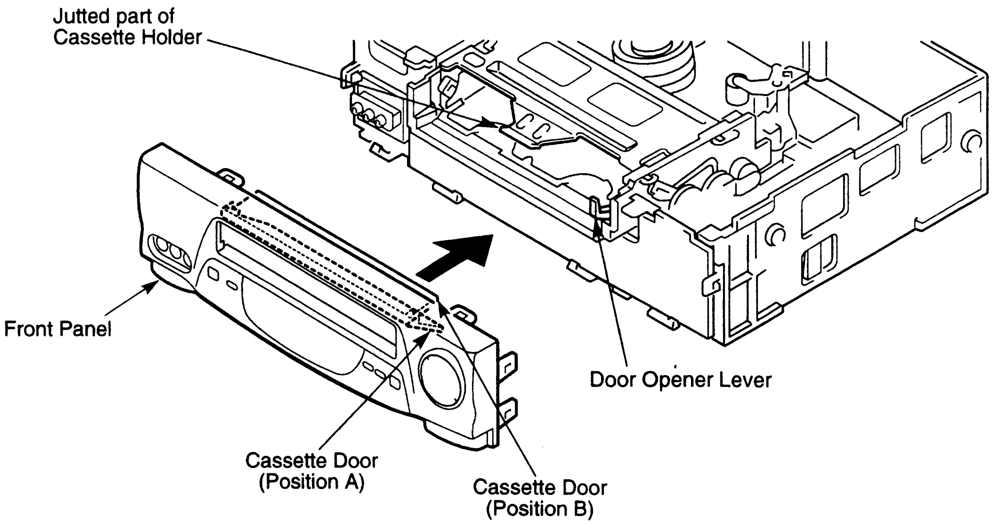
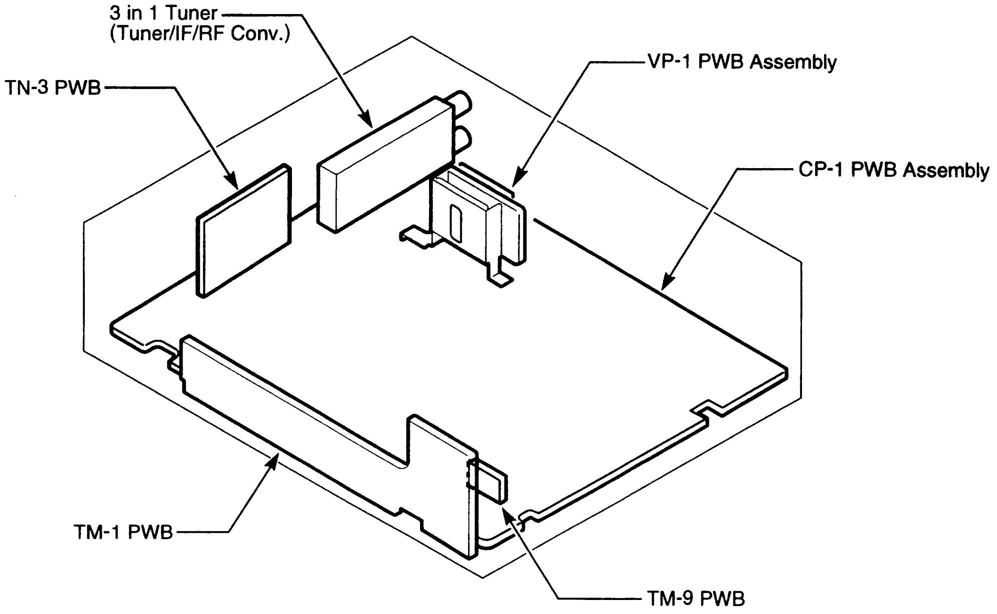

Jutted part of Cassette Holder
Front Panel
Door Opener Lever
Cassette Door (Position A)
Cassette Door (Position B)

Fig. 1-1-5

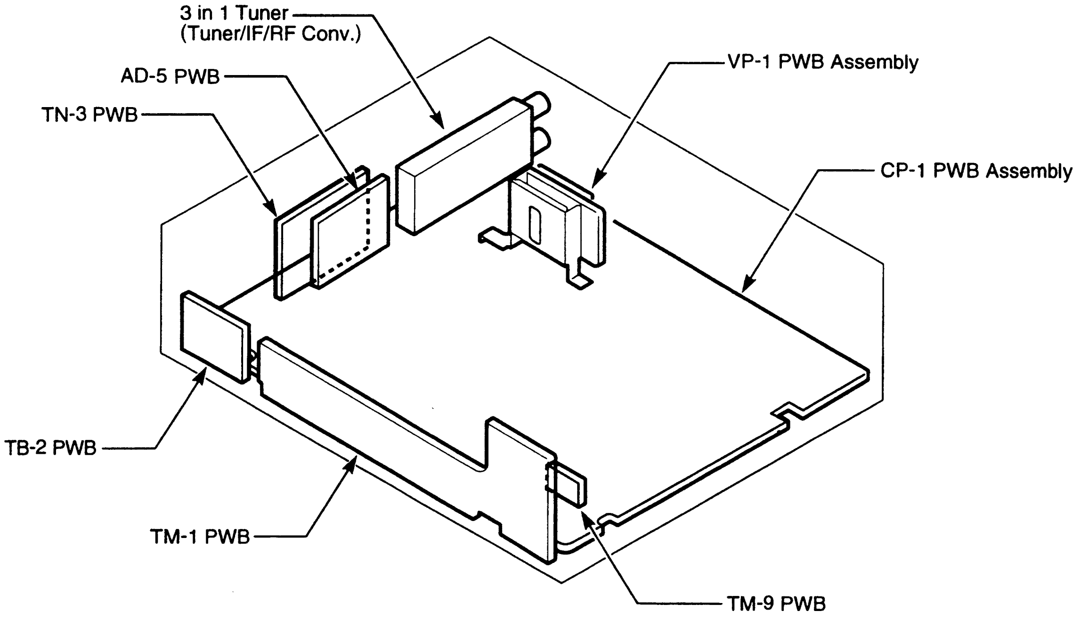
1-4. CIRCUIT BOARD LOCATIONS

L-MP4HN/GQU3, MP4HN/GQU2

VR 2780


3 in 1 Tuner
(Tuner/IF/RF Conv.)
VP-1 PWB Assembly
TN-3 PWB
CP-1 PWB Assembly
TM-1 PWB
TM-9 PWB

VR 2781


3 in 1 Tuner
(Tuner/IF/RF Conv.)
AD-5 PWB
VP-1 PWB Assembly
TN-3 PWB
CP-1 PWB Assembly
TB-2 PWB
TM-1 PWB
TM-9 PWB

2. ELECTRICAL ADJUSTMENT

VCR PRESETTING

This VCR need three basic presetting by using the menus displayed on-screen. After all connection have been made, then follow steps 1 to 3 to preset the VCR.
The three presetting steps will be displayed in sequence on TV screen. The setting are entered with the remote control.

Turn on the VCR

1. Adjusting the TV receiver to the video channel: The AUTO SETUP screen will appear. When the video channel has been preset, press the OK button on the remote control.
2. Country selection: Using the numeric button, select the country of use.
3. Language selection: When the desired language has been select, press the MENU/TV button directly before prevent auto tuning will start.

When steps 1 to 3 have been finish, ready to operate the all operating mode.

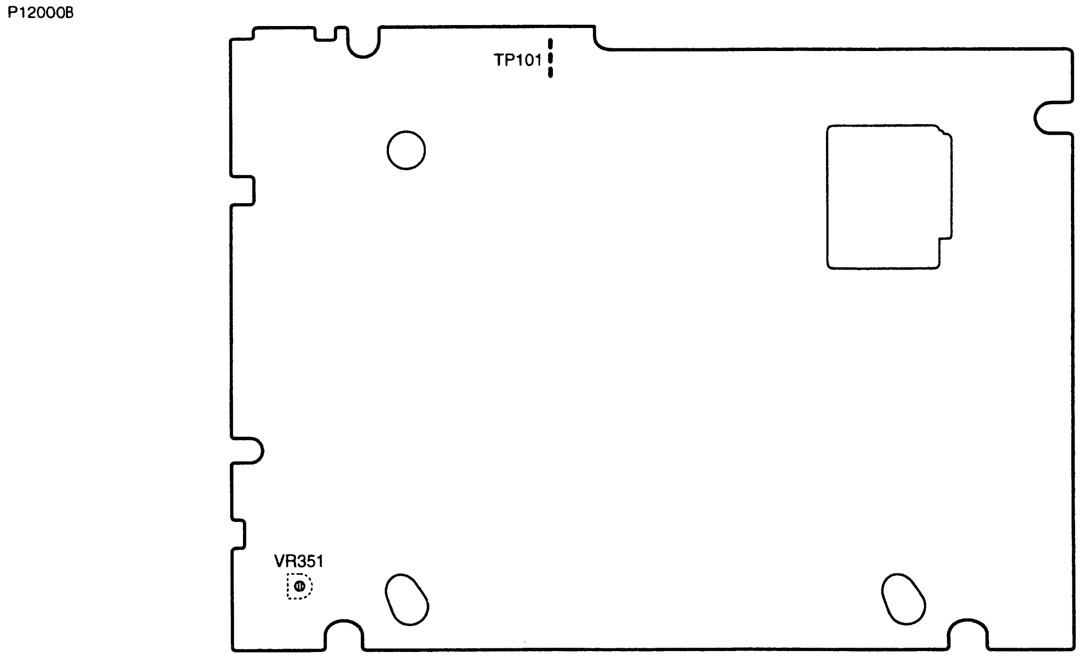
2-1. SERVO CIRCUIT ADJUSTMENT

- These adjustments should be done upon completion of the tape transport adjustments.
- If the tape transport adjustments (except the tilt adjustment) are done after these adjustments, follow the procedures again in section 2-1-3, "Switching position adj."
- When a cassette tape is loaded, auto-tracking will be set immediately after starting the first playback. As this will daviate the tracking center set, be sure to press the channel buttons (+) and (—) once directly after starting playback to prevent auto-tracking from being set.

2-1-1. TEST EQUIPMENT AND STANDARDS REQUIRED

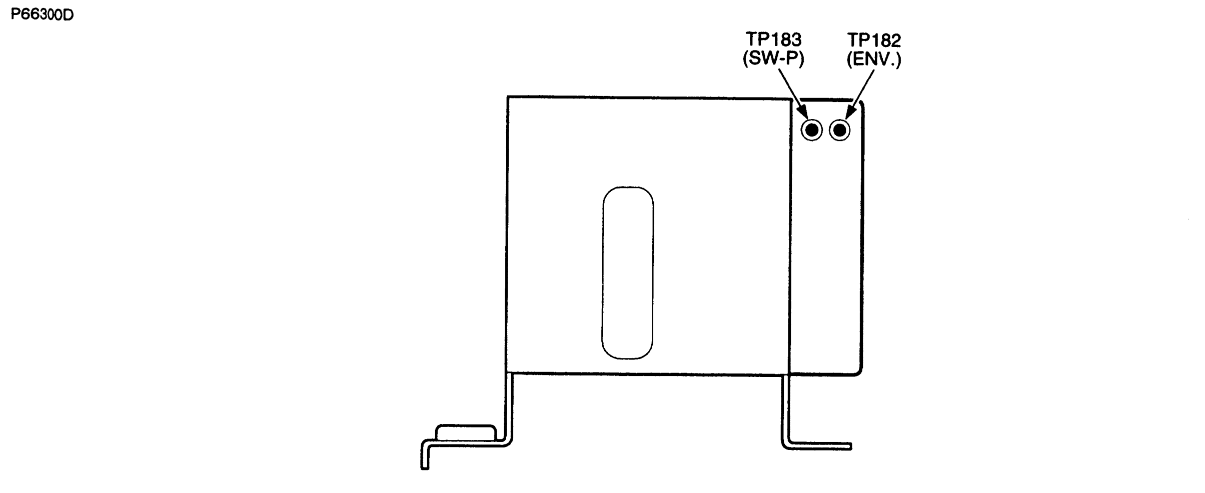
Oscilloscope	Vertical sensitivity Bandwidth	: 5 mV/DIV, external trigger : more than 10 MHz
Alignment Tape	VHJ-0009 or VHJ-0023	: SP mode, monoscope, 6 KHz
Blank Tape	VHS-type cassette tape	
Monitor TV		

2-1-2. LOCATION OF ADJUSTMENT POINTS



CP-1 PWB (Foil side)

Fig. 2-1-1


P66300D
TP183 (SW-P)
TP182 (ENV.)

VP-1 PWB Assembly

Fig. 2-1-2

2-1-3. SWITCHING POSITION ADJ.

Measuring Point	Measuring Equipment	Adj. Condition
TP101 (VIDEO OUT) TP183 (SW-P)	Oscilloscope	PLAY (SP) mode Alignment tape (VHJ-0009 or VHJ-0023)

Adj. Location	Adj. Value
VR351 (SW-P)	6.5 H ± 0.5 H

1. Play back the alignment tape.
2. Set the tracking control position to the center by pressing CHANNEL buttons (+) and (−) simultaneously.
3. Adjust VR351 (SW-P) so that the width of "T" becomes 6.5 H ± 0.5 H as shown in Fig. 2-1-3.

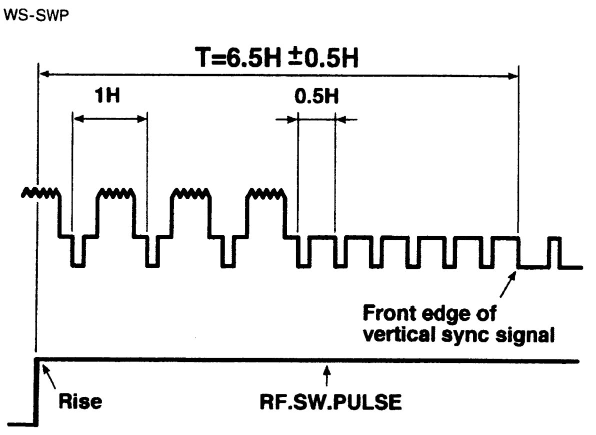

WS-SWP
T=6.5H ±0.5H
1H
0.5H
Front edge of vertical sync signal
Rise
RF.SW.PULSE

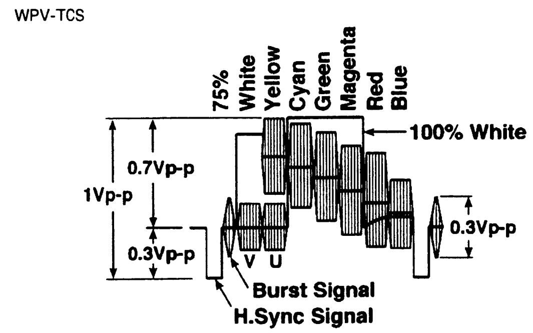
Fig. 2-1-3

2-2. VIDEO CIRCUIT RELAY JIG

2-2-1. TEST EQUIPMENT AND STANDARDS REQUIRED

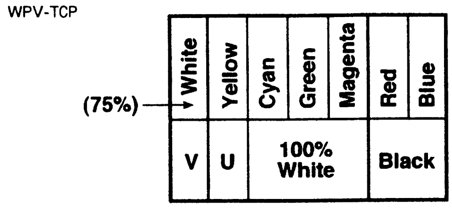
Color Bar Signal Generator	PAL Color bar signel with 100% white level (EBU color bar signel)
Oscilloscope	Vertical sensitivity : 5 mV/DIV, external trigger Bandwidth : more than 10 MHz
Oscilloscope Probe	Input capacity : less than 25 pF (10:1) less than 40 pF (1:1) Covering frequency : DC ~ 40 MHz (10:1) DC ~ 30 MHz (1:1)
Digital Voltmeter	DC range
Alignment Tape	VHJ-0008 or VHJ-0023 : SP mode, color bar, 1 kHz (Color bar signal waveform is described below. Refer to Fig. 2-2-1)
Relay Jig	VHJ-0067 : 12-wire flat cable for VP-1 PWB assembly

ALIGNMENT TAPE COLOR BAR SIGNAL



Color bar signal waveform (VHJ-0008)

Fig. 2-2-1


WPV-TCP
(75%)
White
Yellow
Cyan
Green
Magenta
Red
Blue
V
U
100% White
Black

Color bar pattern (VHJ-0008) on monitor TV

Fig. 2-2-2

RELAY JIG

Connect the flat cable end from the cylinder assembly to the VP-1 PWB assembly using the relay jig to provide simple repairing of the VP-1 PWB assembly, as shown in Fig.2-2-3. Further, when adjusting the VP-1 PWB assembly, be sure to make contact an end of shield case with bracket of the VP-1 PWB assembly to maintain the shield effect. If the VP-1 PWB assembly does not contact, there is insufficient ground and no proper play back image can be obtained.

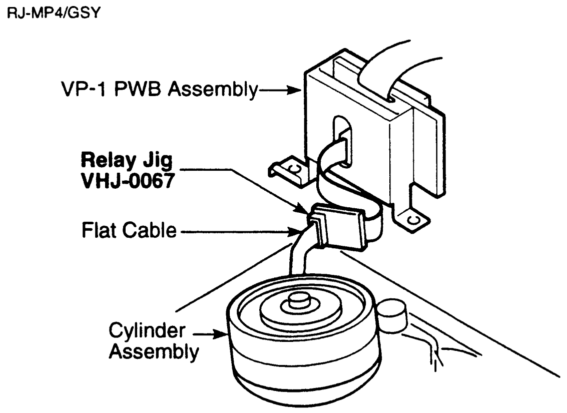

RJ-MP4/GSY
VP-1 PWB Assembly
Relay Jig
VHJ-0067
Flat Cable
Cylinder
Assembly

Fig. 2-2-3

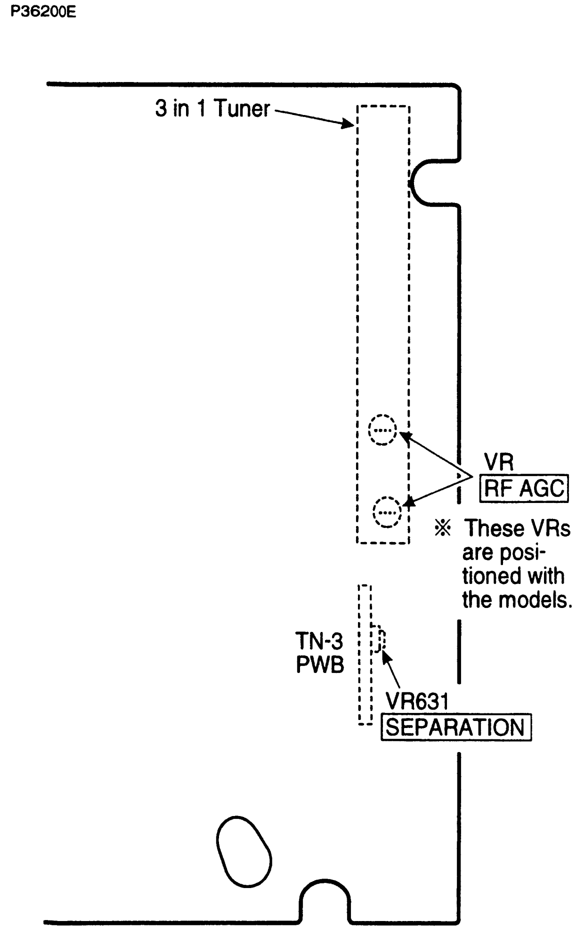
2-3. MTS DECODER CIRCUIT ADJUSTMENT

- If adjusting the MTS Decoder circuit, special equipment shown in section 2-4-1. is necessary.
- Improper adjustment will cause loss of performance of stereo sound and bilingual sound detection.
- Before making these adjustments, be sure to make the adjustments described in section 2-1. " Servo Circuit.", section 2-2. "Video Circuit Relay Jig."

2-3-1. TEST EQUIPMENT AND STANDARDS REQUIRED

Audio Multiplex TV signal Generator	
Oscilloscope	
AC Voltmeter	
Low Path Filter	15 kHz (48dB/oct)

2-3-2. LOCATION OF ADJUSTMENT POINTS



CP-1 PWB (Foil side) **Fig. 2-3-1**

Note:

- Set the following remote control button .to the positions indicated below, before making following adjustments.

REMOTE CONTROL BUTTON	POSITION
TAPE SPEED	SP
INPUT	AV
AUDIO	LR

2-3-3. SEPARATION ADJ.

Measuring Point	Measuring Equipment	Adj. Condition
AUDIO OUTPUT terminal EURO pin3 (Lch)	Audio Multiplex TV signal generator Oscilloscope Low path filter 15 kHz (48 dB/oct)	E-E mode

Adj. Location	Adj. Value
VR631 (SEPARATION)	Minimum level

1. Input the output signal of the audio multiplex TV signal generator into the VCR ANT input terminal.
2. Connect the oscilloscope to the audio output terminal EURO pin 3 (Lch) of the VCR via the LPF.
3. Set the audio multiplex TV signal generator as follows.
   Audio signal Rch: 1 kHz 30% modulation
   Audio signal Lch: Unmodulation
4. Adjust VR631 (SEPARATION) so that the output of the audio output terminal (Lch) is brought to its minimum level.

2-4. IF CIRCUIT ADJUSTMENT

- In this model, the circuits of the TUNER, IF, and RF converter have been made into one. Therefore, should one circuit malfunction, the whole unit must be replaced.
- The adjustments for the IF (RF AGC) circuit of the 3 in 1 tuner are described below.

Note: The 3 in tuner dose not need any adjustments, because precise adjustments were down before shipment.

2-4-1. TEST EQUIPMENT AND STANDARD REQUIRED

Monitor TV	

2-4-2. LOCATION OF ADJUSTMENT POINT

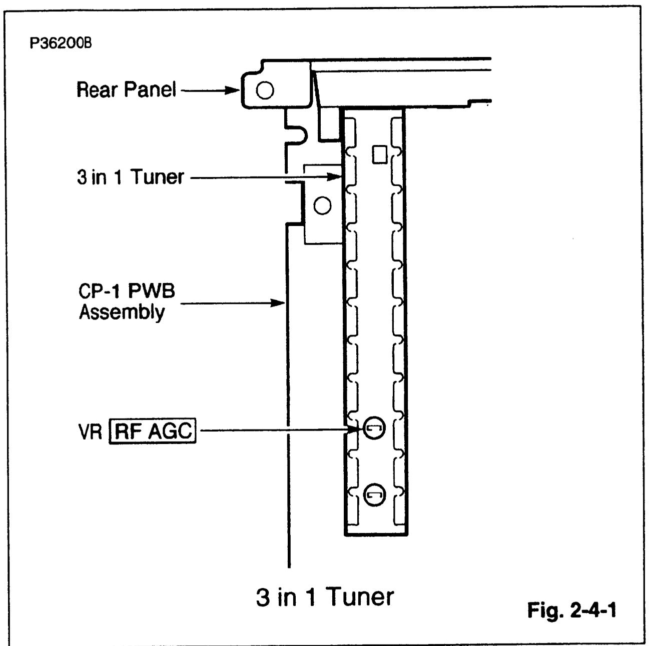


Fig. 2-4-1

2-4-3. RF AGC ADJ.

Measuring Point	Measuring Equipment	Adj. Condition
Picture of monitor TV	Monitor TV	E-E mode

Adj. Location	Adj. Value
VR (RF AGC) (on the 3 in 1 tuner)	S/N is best point

1. Connect the monitor TV to the VHF/UHF antenna output terminal.
2. Connect the VHF or UHF antenna to the VHF/UHF antenna input terminal.
3. Receive the middle electrical field (70 dBμ ~ 90 dBμ) of the VHF or UHF channel, and slowly turn the VR (RF AGC) from the point where snow-noise is present to the point where it just disappears from the monitor TV.
4. Confirm by monitor TV that there is no beat and saturation (S/N is best point) when receiving any TV channel.

2-5. CHECKING THE RF CHANNEL

If the TV and VCR are connected by an aerial output cable which has poor shielding characteristics, turn off the RF converter of the VCR and use the VCR with an AV cable. To turn the RF converter off, input "00" when setting the RF (when "RF" is displayed) during VCR pre-setting.

3. TEST POINTS FOR TAPE PATH ADJUSTMENT

Test points TP182 (ENV) and TP183 (SW-P) for tape path adjustment are shown in figure below.
For adjustment, refer to the separate volume "V95 II Mechanism Manual" (MM531616).

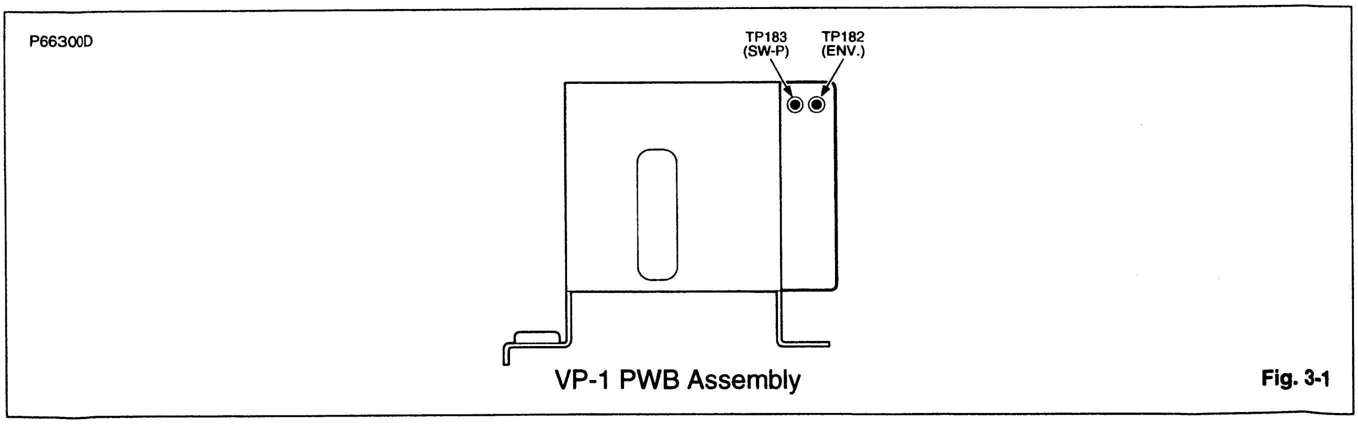


Fig. 3-1

4. PARTS LIST

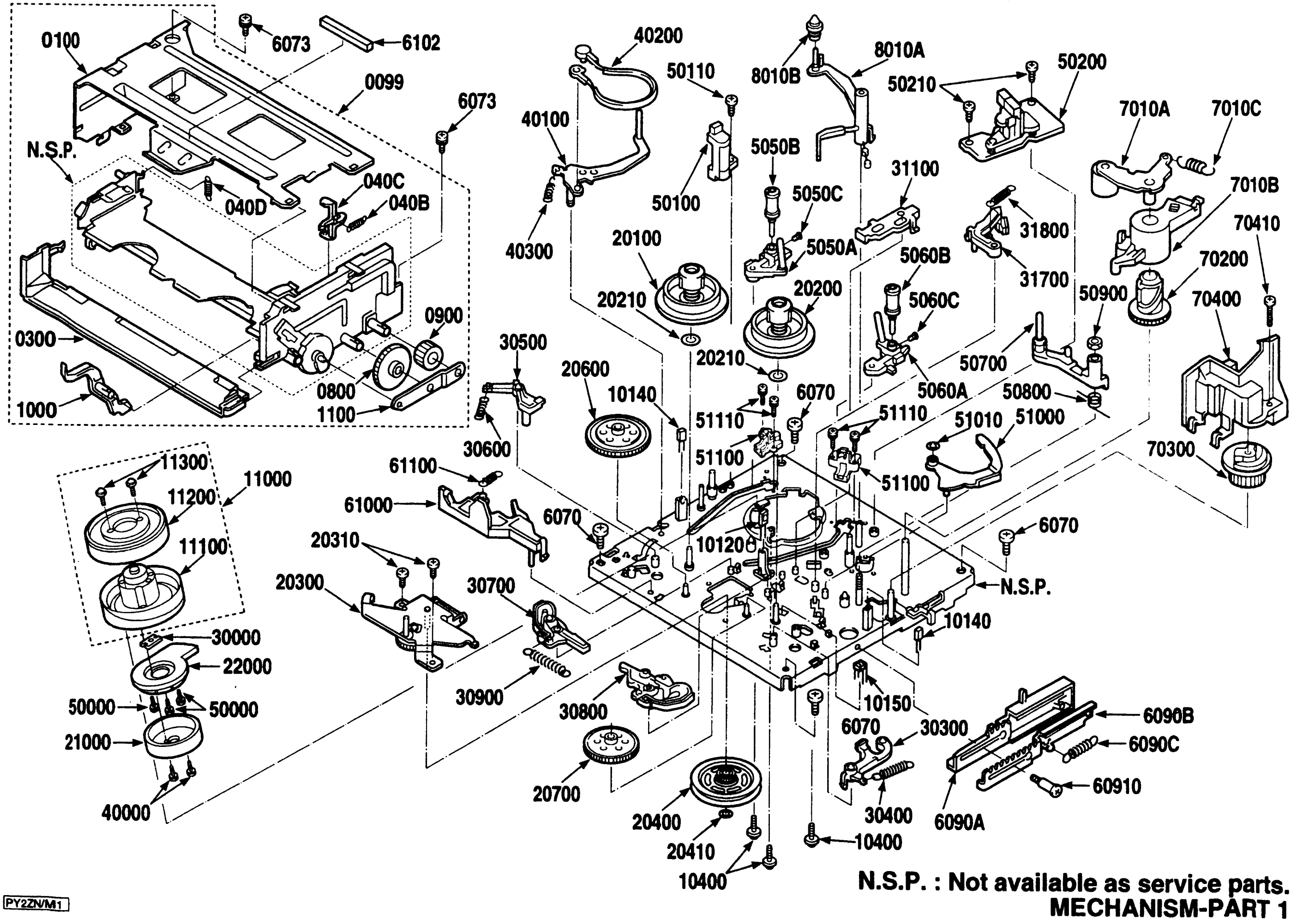
MECHANISM PARTS

Note:

1.For Location numbers 8010A and 8010B, parts marked (#C) and (#D) in DESCRIPTION are not interchangeable with each other.
However, these are interchangeable when 8010A and 8010B are in the assembled state.
(#C) and (#D) can be differentiated from the color and height of the roller (8010B).
(#C) is gray and toll and (#D) is black and short.

MECHANISM PARTS 1

LOCATION	PARTS NO.	DESCRIPTION
11000	613 164 5981	COMPL,CYLINDER,4H6P-R2
11100	613 162 4672	ASSY,CYLINDER,LWR 6K
11200	613 096 2751	ASSY,CYLINDER,UPR 4H6P-R2
11300	613 164 6001	SCR PAN+W 3X8
21000	645 015 7875	MOTOR,ROTOR,CYL DC 2W
22000	645 015 7868	MOTOR,STATOR,CYL DC 2W
30000	613 097 2170	SPACER,MOTOR
40000	412 036 5001	SPECIAL SCREW 2.3X6
50000	412 036 4905	SPECIAL SCREW 2.3X10
6073	412 048 8205	SPECIAL SCREW-2.6X6
6102	613 151 6618	PAD
0099	613 152 0578	COMPL,CASSETTE MECHANISM
0100	613 152 0738	STAND L
0300	613 152 0660	FRAME UNDER
040B	613 152 0417	SPRING,LID OPENER
040C	613 152 0707	LEVER,RELEASE
040D	613 152 0424	SPRING,TRAY LOCK
0800	613 152 2794	GEAR,LOCK
0900	613 152 2800	GEAR,PINION
1000	613 151 9480	LEVER,DOOR OPENER
1100	613 151 9299	HOLDER,GEAR
6070	411 021 7907	SCR S-TPG BIN 4X12
10120	407 162 1102	LED LN59L(D8003)
10140	407 162 8705	PHOTO DIODE PN263L-(NC) (D8001,D8002) S,T SENSOR
10400	412 052 6204	SPECIAL SCREW-2.6X5.5
10150	407 165 8108	PHOTO COUPLE SG-105F(PC801)
OR	407 043 0101	PHOTO DIODE ON2170-R(PC801)
20100	613 160 5503	ASSY,REEL SUPPLY
OR	613 169 0974	REEL,SUPPLY
20200	613 160 4193	ASSY,REEL TAKE UP
OR	613 168 1514	ASSY,REEL TAKE UP
20210	412 015 8504	SPECIAL WASHER 3.1X6X0.5
OR	412 015 8900	SPECIAL WASHER 3.1X6X0.4
OR	412 021 5306	SPECIAL WASHER 3.1X6X0.3
20300	613 175 0661	COMPL,MOUNTING CLUTCH
OR	613 171 6896	COMPL,MOUNTING CLUTCH
20310	412 048 7505	SPECIAL SCREW-2.6X4
20400	613 151 9701	PULLEY,REEL
20410	412 045 4606	SPECIAL WASHER 2.4X6X0.25
20600	613 152 2749	GEAR,REEL S
20700	613 152 2756	GEAR,REEL T
30300	613 160 3356	ASSY,BRAKE SOFT T
30400	613 152 0295	SPRING,SOFT T
30500	613 151 9411	LEVER,SOFT S
30600	613 152 0318	SPRING,SOFT S
30700	613 160 6166	ASSY,BRAKE,S
30800	613 159 2193	ASSY,BRAKE T
30900	613 163 6996	SPRING,BRAKE
31100	613 152 0189	SLIDE,ACT BRAKE T
31700	613 151 8490	ASSY,BRAKE CAPSTAN
31800	613 152 0356	SPRING,BRAKE CAPSTAN
40100	613 151 8759	ASSY,LEVER,BT

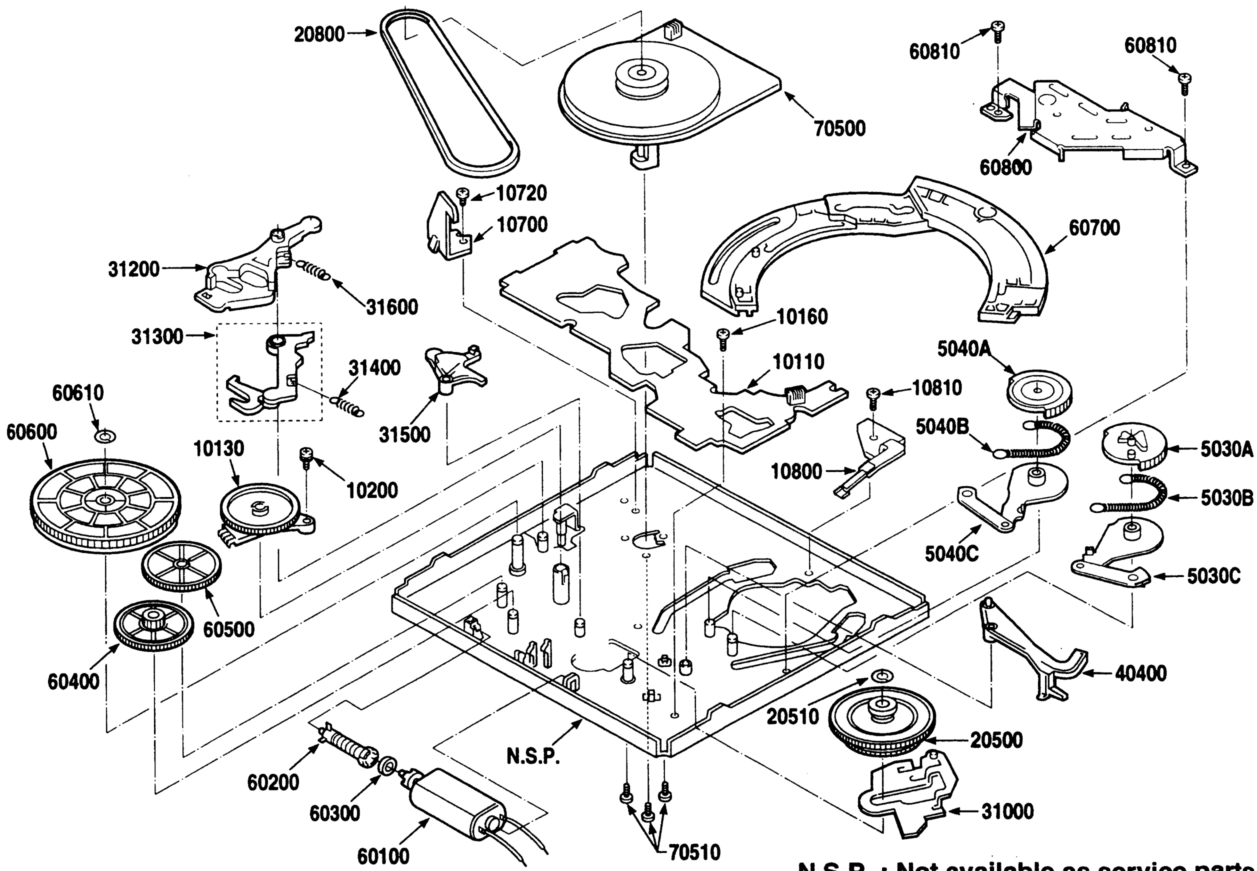

0100
6073
6102
0099
6073
N.S.P.
040C
040D
040B
0900
0300
0800
1000
1100
11300
11200
11000
11100
30000
22000
50000
50000
21000
40000
40200
50110
40100
50100
40300
20100
20210
30500
20600
10140
30600
61100
61000
20310
20300
30700
30900
30800
20700
20400
20410
10400
8010B
8010A
5050B
5050C
5050A
20200
20210
6070
51110
51100
10120
6070
50210
50200
31100
5060B
5060C
5060A
31800
31700
50700
50900
50800
51110
51010
51000
51100
7010A
7010C
7010B
70410
70200
70400
70300
6070
N.S.P.
10140
10150
6070
30300
30400
10400
6090B
6090C
60910
6090A

N.S.P. : Not available as service parts.
MECHANISM-PART 1

LOCATION	PARTS NO.	DESCRIPTION
40200	613 160 5282	ASSY,BRAKE,BAND
40300	613 152 0271	SPRING,BT
50100	645 017 6432	HEAD,ERASE FULL
50110	412 048 9707	SPECIAL SCREW-2.6X10
50200	613 176 8406	ASSY,HEAD R/P ACE
50210	412 052 3500	SPECIAL SCREW 2.6X12
5050A	613 164 7237	ASSY,MOUNTING,INCLINE S
5050B	613 022 0233	ASSY,GUIDE,ROLLER
5050C	412 048 4504	SPECIAL SCREW-2X3
5060A	613 164 7251	ASSY,MOUNTING,INCLINE T
5060B	613 022 0233	ASSY,GUIDE,ROLLER
5060C	412 048 4504	SPECIAL SCREW-2X3
50700	613 164 4762	ASSY,LEVER,LOAD
50800	613 152 0387	SPRING,LEVER L GUIDE
50900	412 048 8908	SPECIAL NUT-3X3
51000	613 173 6153	ASSY,LEVER,ACT L GUIDE
OR	613 161 2365	ASSY,LEVER,ACT L GUIDE
51010	412 033 4106	WASHER SLIT 2.6X5X0.50
51100	613 160 7057	MOUNTING,CATCHER
51110	412 049 1700	SPECIAL SCREW-2.6X10
6090A	613 151 9152	GEAR,RACK FRONT
OR	613 160 4636	GEAR,RACK FRONT
6090B	613 151 9114	GEAR,RACK START
6090C	613 152 0226	SPRING,RACK FRONT
60910	412 050 2802	SPECIAL SCREW-2.6X6
61000	613 151 9398	LEVER,EP SW
61100	613 152 3692	SPRING,EP SW
7010A	613 151 8803	ASSY,LEVER,PINCH ROLLER
7010B	613 171 0221	MOUNTING,LIFT PINCH
7010C	613 152 0233	SPRING,PINCH ROLLER
70200	613 156 3841	CAM,LIFT PINCH
70300	613 152 0677	GEAR,CAM PINCH
70400	613 152 0714	MOUNTING,OPENER
70410	412 049 1106	SPECIAL SCREW-2.6X16
8010A	613 159 7273	LEVER,CLEANER (#C)
8010A	613 171 9606	LEVER,CLEANER (#D)
8010B	613 158 5829	ASSY,ROLLER,CLEANER (#C)
8010B	613 171 9439	ASSY,MOUNTING CLEANER (#D)

MECHANISM PARTS 2

LOCATION	PARTS NO.	DESCRIPTION
10110	613 173 9451	COMPL PWB,MC-1
10130	645 007 1560	SWITCH,MODE(S8001)
10160	412 048 7505	SPECIAL SCREW-2.6X4
10200	412 048 8304	SPECIAL SCREW-2.6X8
10700	613 167 5926	MOUNTING CAPSTAN
10720	412 048 8007	SPECIAL SCREW-2.6X6
10800	613 165 8523	ASSY,EARTH CYL
10810	412 048 8007	SPECIAL SCREW-2.6X6
20500	613 160 4186	ASSY,GEAR,FRICTION
20510	411 109 1605	WASHER Y 2.6X6X0.25
20800	613 151 9039	BELT,REEL
31000	613 152 0165	SLIDE,ACT BRAKE S
31200	613 159 0991	LEVER,CONTROL BRAKE
31300	613 159 0847	COMPL,LEVER,ACT BRAKE
31400	613 152 0332	SPRING,RETURN BRAKE
31500	613 151 9459	LEVER,CHANGE CLUTCH
31600	613 152 0349	SPRING,CHANGE CLUTCH
40400	613 153 7583	ASSY,LEVER SPRING BT
5030A	613 152 2763	GEAR,LOAD S
5030B	613 152 0370	SPRING,LOAD S
5030C	613 160 3691	ASSY,LEVER,LOAD S
5040A	613 152 2770	GEAR,LOAD T
5040B	613 152 0363	SPRING,LOAD T
5040C	613 160 3707	ASSY,LEVER,LOAD T
60100	645 003 4305	ASSY,MOTOR LOADING
60200	613 151 8599	COMPL,GEAR,WORM
60300	613 151 9107	DAMPER
60400	613 151 9138	GEAR,WHEEL 1
60500	613 160 3790	GEAR,WHEEL 2
60600	613 156 4008	CAM,MAIN
60610	412 054 6806	SPECIAL WASHER 3.6X0.5
60700	613 159 9017	SLIDE,CRESCENT
60800	613 159 8997	MOUNTING,CRESCENT
60810	412 048 8007	SPECIAL SCREW-2.6X6
70500	645 008 1880	MOTOR,CAPSTAN
70510	412 048 7604	SPECIAL SCREW-2.6X6



N.S.P. : Not available as service parts.

MECHANISM-PART 2

MA4/U4-M2

ACCESSORIES

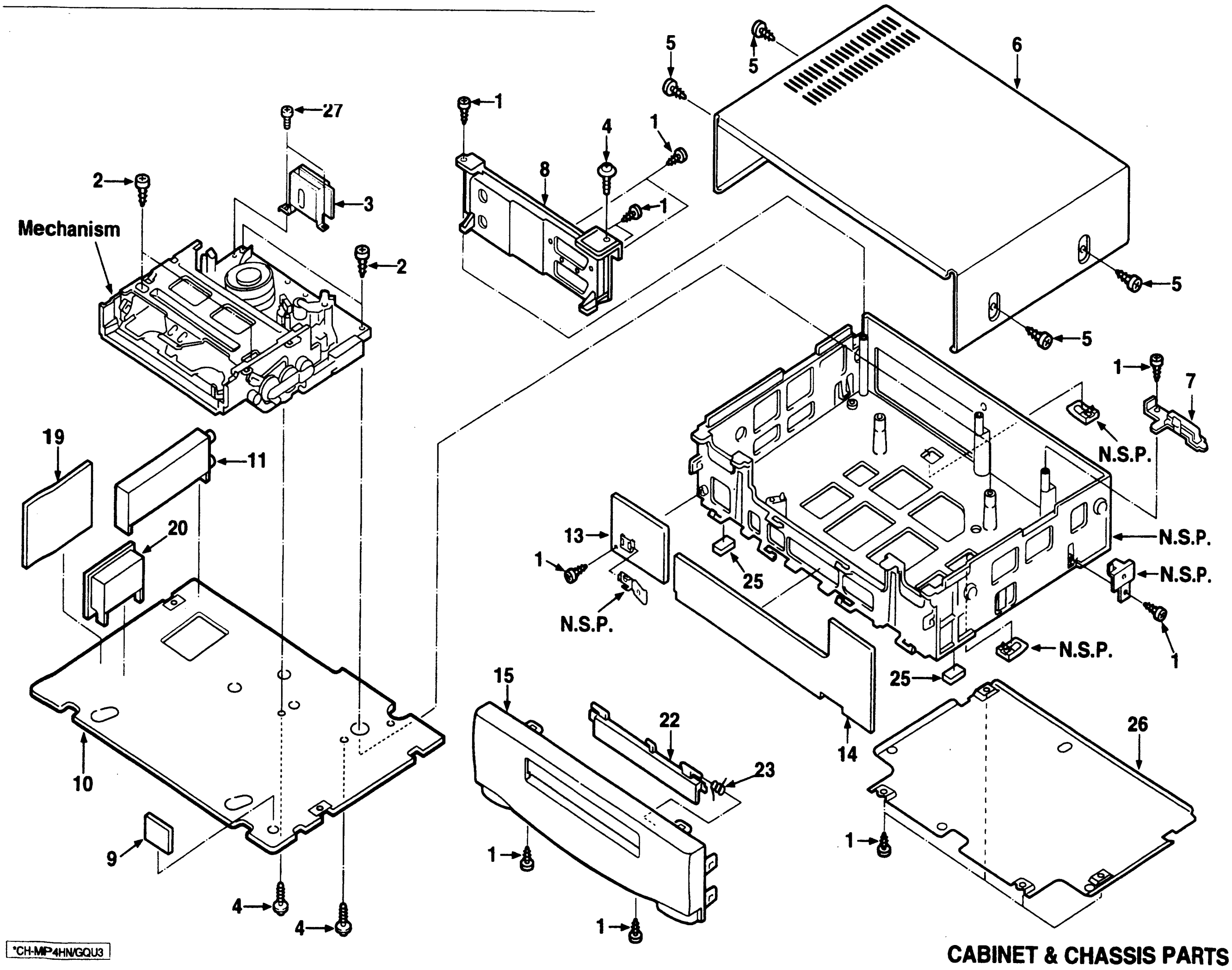
LOCATION	PARTS NO.	DESCRIPTION
	645 027 2349	REMOCON,INFRARED, WITH COVER BATTERY,VR 2780 ONLY
	645 027 3360	REMOCON,INFRARED, WITH COVER BATTERY,VR 2781 ONLY
	613 169 4385	COVER BATTERY,FOR REMOCON, VR 2780 ONLY
	613 177 1901	COVER BATTERY,FOR REMOCON, VR 2781 ONLY
	613 179 9646	INSTRUCTION MANUAL,VR 2780 ONLY
	613 179 6515	INSTRUCTION MANUAL,VR 2781 ONLY
	645 023 4170	CABLE,ANT PAL
OR	645 003 1182	CABLE,ANT PAL
OR	645 009 4569	CABLE,ANT PAL
OR	645 025 1382	CABLE,ANT PAL
	⚠645 024 0522	CORD,POWER
OR	⚠645 025 0767	CORD,POWER
OR	⚠645 019 2647	CORD,POWER
OR	⚠613 132 3568	CORD,POWER
OR	⚠645 002 6805	CORD,POWER
OR	⚠645 003 3766	CORD,POWER
OR	⚠645 009 0400	CORD,POWER
OR	⚠645 023 4163	CORD,POWER

PACKING & CHASSIS PARTS

	613 179 7819	CARTON CASE,VR 2781 ONLY
	613 179 9226	CARTON CASE,VR 2780 ONLY
	613 166 7105	CUSHION,FRONT
	613 166 7112	CUSHION,BACK
	613 139 8047	POLYE COVER,INNER-K

CABINET & CHASSIS PARTS

LOCATION	PARTS NO.	DESCRIPTION
1	411 137 0007	SCR L-TPG BIN 3X10
2	411 021 7907	SCR S-TPG BIN 4X12
3	613 172 9162	COMPL PWB,VP-1
4	412 052 5108	SPECIAL SCREW-2.6X12
5	412 028 9406	SPECIAL SCREW
6	613 161 2952	COVER TOP
OR	613 177 5398	COVER TOP
7	613 160 2885	HOLDER
8	613 173 4418	TERMINAL,VR 2781 ONLY
8	613 173 5620	TERMINAL,VR 2780 ONLY
9	613 158 5751	COMPL PCB,TM-9
10	613 179 7055	COMPL PWB,CP-1-A,VR 2781 ONLY
10	613 179 9752	COMPL PWB,CP-1-A,VR 2780 ONLY
11	645 019 0070	TUNER,RF/TU/IF
13	613 179 6614	COMPL PWB,TB-2,VR 2781 ONLY
14	613 179 6645	COMPL PWB,TM-1,VR 2781 ONLY
14	613 179 6621	COMPL PWB,TM-1,VR 2780 ONLY
15	613 179 7277	ASSY,CABINET FRONT,SID,VR 2781 ONLY
15	613 179 9059	ASSY,CABINET FRONT,SID,VR 2780 ONLY
19	613 173 4470	COMPL PWB,TN-3
20	613 176 3982	COMPL PWB,AD-5,VR 2781 ONLY
22	613 179 7635	DOOR CASSETTE
23	613 153 0478	SPRING,DOOR
25	613 121 1001	STAND,FELT,(FRONT)
26	613 160 5091	COVER BOTTOM
27	411 001 1901	SCR S-TPG BIN 3X6



CH-MP4HN/GQU3

CABINET & CHASSIS PARTS

ELECTRICAL PARTS

Note:

1. Materials of Capacitors and Resistors are abbreviated as follows ;

Resistors	
MT-FILM	Metallized Film Resistor
MT-GLAZE	Metallized Glaze Resistor
OXIDE-MT	Oxide Metallized Film Resistor

Capacitors	
MT-POLYEST	Metallized Polyester Capacitor
MT-COMPO	Metallized Composite Capacitor
TA-SOLD	Tantalum Solid Capacitor
AL-SOLID	Aluminum Solid Capacitor
NP-ELECT	Non-Polarized Electrolytic Capacitor
OS-SOLID	Aluminum Solid Capacitors with Organic Semiconductive Electrolytic Capacitor
DL-ELECT	Double Layered Electrolytic Capacitor

2. Tolerance of Capacitor (10pF over) and Resistor are noted with follow symboles.

F ....1%   G ....2%   J ....5%   K 10%
M ....20%   N ....30%   Z ....+80% ~ -20%

3. Capacitors

U : μF   P : pF

4. Inductors

UH : μH   MH : mH

5. N.S.P. : Not available as service parts.

LOCATION	PARTS NO.	DESCRIPTION
COMPL PWB,CP-1-A		
	613 179 7055	VR 2781 ONLY
	613 179 9752	VR 2780 ONLY
	(CONNECTORS)	
CN231	645 021 1508	SOCKET,RGB 21P (N.S.P),VR 2780 ONLY
OR	645 026 1602	SOCKET,RGB 21P (N.S.P),VR 2780 ONLY
CN231	645 021 1522	SOCKET,RGB 21P (N.S.P),VR 2781 ONLY
OR	645 026 1619	SOCKET,RGB 21P (N.S.P),VR 2781 ONLY
CN301	645 009 4408	SOCKET,FFC 35P (N.S.P),VR 2781 ONLY
OR	645 005 4808	SOCKET,35P (N.S.P),VR 2781 ONLY
CN301	645 009 4361	SOCKET,FFC 31P (N.S.P),VR 2780 ONLY
OR	645 005 4761	SOCKET,31P (N.S.P),VR 2780 ONLY
CN303	645 007 8422	PLUG,12P (N.S.P)
CN351	645 007 8927	PLUG,6P (N.S.P)
CN352	645 008 1842	PLUG,8P (N.S.P)
CN501	⚠ 645 000 5411	SOCKET,INLET AC (N.S.P)
	(SEMICONDUCTORS)	
Q1002	405 035 6100	TR 2SC2413K-Q
Q1004	405 014 4509	TR 2SC2412K-R
OR	405 014 4608	TR 2SC2412K-S
Q1005	405 014 4509	TR 2SC2412K-R
OR	405 014 4608	TR 2SC2412K-S
Q1007	405 002 0308	TR 2SA1037K-R
OR	405 002 0407	TR 2SA1037K-S
Q1101	405 002 0308	TR 2SA1037K-R
OR	405 002 0407	TR 2SA1037K-S
Q1102	405 014 4509	TR 2SC2412K-R
OR	405 014 4608	TR 2SC2412K-S
Q1301	405 006 1806	TR 2SA933S-R
Q1303	405 006 1806	TR 2SA933S-R,VR 2781 ONLY
Q1304	405 002 0308	TR 2SA1037K-R
OR	405 002 0407	TR 2SA1037K-S
Q1402	405 002 0308	TR 2SA1037K-R
OR	405 002 0407	TR 2SA1037K-S
Q2021	405 018 0002	TR 2SC3331-S
OR	405 018 0101	TR 2SC3331-T
OR	405 018 0200	TR 2SC3331-U
Q2022	405 025 0200	TR 2SD734-G
OR	405 024 9907	TR 2SD734-F
Q2023	405 003 5609	TR 2SA1318-S
OR	405 003 5708	TR 2SA1318-T
OR	405 003 5807	TR 2SA1318-U
Q2024	405 018 0002	TR 2SC3331-S
OR	405 018 0101	TR 2SC3331-T
OR	405 018 0200	TR 2SC3331-U
Q2025	405 018 0002	TR 2SC3331-S
OR	405 018 0101	TR 2SC3331-T
OR	405 018 0200	TR 2SC3331-U
Q2026	405 029 3504	TR DTC144EK,VR 2781 ONLY
Q2027	405 000 2007	TR DTA144EK,VR 2781 ONLY
Q2031	405 029 3504	TR DTC144EK
Q2302	405 006 6702	TR 2SA984-F
Q2302	405 006 7204	TR 2SA984K-F
Q2341	405 064 0100	TR 2SA1561-Q
OR	405 064 0209	TR 2SA1561-R
OR	405 123 6708	TR 2SB1320A-Q
OR	405 123 6807	TR 2SB1320A-R
Q2342	405 015 8407	TR 2SC2812-L5
OR	405 015 8704	TR 2SC2812-L6
OR	405 014 4509	TR 2SC2412K-R
OR	405 014 4608	TR 2SC2412K-S
Q2351	405 000 0508	TR DTA114ES,VR 2781 ONLY
Q2352	405 029 3504	TR DTC144EK,VR 2781 ONLY
Q2353	405 018 0101	TR 2SC3331-T,VR 2781 ONLY
OR	405 018 0200	TR 2SC3331-U,VR 2781 ONLY
Q2391	405 002 6508	TR 2SA1179-M5,VR 2781 ONLY
OR	405 002 6706	TR 2SA1179-M6,VR 2781 ONLY
OR	405 002 0308	TR 2SA1037K-R,VR 2781 ONLY
OR	405 002 0407	TR 2SA1037K-S,VR 2781 ONLY
Q2392	405 029 3504	TR DTC144EK,VR 2781 ONLY
Q3504	405 029 3504	TR DTC144EK
Q3551	405 014 4509	TR 2SC2412K-R
OR	405 014 4608	TR 2SC2412K-S
Q3552	405 014 4509	TR 2SC2412K-R
OR	405 014 4608	TR 2SC2412K-S
Q3553	405 014 4509	TR 2SC2412K-R
OR	405 014 4608	TR 2SC2412K-S
Q3554	405 029 3504	TR DTC144EK
Q5001	405 126 0208	TR 2SK1460LS
Q5002	405 013 7006	TR 2SC2274-F
OR	405 013 7303	TR 2SC2274K-F
Q5003	405 006 6702	TR 2SA984-F
OR	405 006 7204	TR 2SA984K-F
Q5004	405 013 7006	TR 2SC2274-F
OR	405 013 7303	TR 2SC2274K-F
Q5101	405 089 2103	TR 2SC4483-S
OR	405 089 2202	TR 2SC4483-T
Q5102	405 089 2103	TR 2SC4483-S
OR	405 089 2202	TR 2SC4483-T
Q5103	405 013 6801	TR 2SC2274-E
OR	405 013 7006	TR 2SC2274-F
OR	405 013 7204	TR 2SC2274K-E
OR	405 013 7303	TR 2SC2274K-F
Q5104	405 089 2103	TR 2SC4483-S
OR	405 089 2202	TR 2SC4483-T
Q5105	405 099 8508	TR 2SC4640S
OR	405 011 8401	TR 2SC1740S-Q
OR	405 093 0607	TR KSC2785-Y
OR	405 099 8607	TR 2SC4640T
OR	405 011 8500	TR 2SC1740S-R
Q5131	405 089 2103	TR 2SC4483-S
OR	405 089 2202	TR 2SC4483-T
Q5132	405 000 0409	TR DTA114EK
Q5133	405 000 2908	TR DTC114EK
Q5134	405 099 8508	TR 2SC4640S

LOCATION	PARTS NO.	DESCRIPTION
Q53134	405 011 8401	TR 2SC1740S-Q
OR	405 093 0607	TR KSC2785-Y
OR	405 099 8607	TR 2SC4640T
OR	405 011 8500	TR 2SC1740S-R
	(INTEGRATED CIRCUITS)	
IC101	410 273 1909	IC LA71511ML-MPB
IC102	409 372 4508	IC LC89977M
IC131	409 258 5209	IC BA7630S,VR 2781 ONLY
IC141	410 255 5307	IC LC74783M-9095
IC231	409 406 0100	IC BH7801BK
OR	409 392 2201	IC BH7801AK
IC232	409 051 2900	IC TC4053BF,VR 2781 ONLY
OR	409 051 2900	IC TC4053BF,VR 2781 ONLY
IC233	409 051 2900	IC TC4053BF,VR 2781 ONLY
OR	409 051 2900	IC TC4053BF,VR 2781 ONLY
IC301	410 293 2801	IC LC866852A-5F08
IC302	409 314 2005	IC LB1643
IC303	409 313 0903	IC MN1381-L
OR	409 243 4101	IC MN1380-L
IC304	410 177 3702	IC AT24C04-10PC
OR	409 348 6901	IC XL24C04P
OR	410 172 6906	IC X24C04PC7346
OR	410 189 5800	IC 24LC04B/P
IC351	409 398 5008	IC BU2896AK
IC511	409 180 2307	IC UPC1093J
	(DIODES)	
D1005	407 012 4406	DIODE 1SS133
D1301	407 012 4406	DIODE 1SS133
D1302	407 012 4406	DIODE 1SS133
D1303	407 012 4406	DIODE 1SS133,VR 2781 ONLY
D1304	407 012 4406	DIODE 1SS133,VR 2781 ONLY
D1341	407 012 4406	DIODE 1SS133,VR 2780 ONLY
D1342	407 012 4406	DIODE 1SS133,VR 2780 ONLY
D1345	407 063 8804	ZENER DIODE MTZJ5.6A,VR 2781 ONLY
D1346	407 063 8804	ZENER DIODE MTZJ5.6A,VR 2781 ONLY
D2301	407 012 4406	DIODE 1SS133
D2341	407 012 4406	DIODE 1SS133
D2371	407 099 7000	ZENER DIODE MTZJ15B
D2372	407 063 8804	ZENER DIODE MTZJ5.6A,VR 2781 ONLY
D2373	407 099 7000	ZENER DIODE MTZJ15B,VR 2781 ONLY
D2374	407 063 8804	ZENER DIODE MTZJ5.6A,VR 2781 ONLY
D3001	407 012 4406	DIODE 1SS133
D3102	407 012 4406	DIODE 1SS133
D3105	407 012 4406	DIODE 1SS133
D3106	407 012 4406	DIODE 1SS133,VR 2781 ONLY
D3107	407 012 4406	DIODE 1SS133,VR 2781 ONLY
D3108	407 012 4406	DIODE 1SS133,VR 2781 ONLY
D3114	407 012 4406	DIODE 1SS133,VR 2781 ONLY
D3115	407 012 4406	DIODE 1SS133
D3116	407 012 4406	DIODE 1SS133
D3117	407 012 4406	DIODE 1SS133
D3120	407 012 4406	DIODE 1SS133
D3122	407 012 4406	DIODE 1SS133,VR 2781 ONLY
D3124	407 012 4406	DIODE 1SS133
D3401	407 100 0006	ZENER DIODE MTZJ33C
D3502	407 012 4406	DIODE 1SS133
D3505	407 100 6602	DIODE 1SS291
D3506	407 100 6602	DIODE 1SS291
D3554	407 012 4406	DIODE 1SS133
D5001	407 197 6509	DIODE DB155G-S
OR	407 104 5304	DIODE S1WB(A)60
D5003	407 078 2705	DIODE 1SS244
D5004	407 078 2705	DIODE 1SS244
D5006	407 078 2705	DIODE 1SS244
D5010	407 091 6704	DIODE AP01C
D5013	⚠407 169 5608	PHOTO COUPLE PC123U2
D5101	407 169 5707	DIODE RL2Z-LF-C4
OR	407 198 2609	DIODE SF34
OR	407 160 9308	DIODE ERB93-02L3
D5102	407 198 2500	DIODE SF24
D5103	407 078 2705	DIODE 1SS244
D5104	407 078 2705	DIODE 1SS244
D5105	407 198 2401	DIODE SFT14
D5107	407 063 8903	ZENER DIODE MTZJ5.6C
D5108	407 063 8903	ZENER DIODE MTZJ5.6C
D5109	407 063 8903	ZENER DIODE MTZJ5.6C
D5110	407 099 6607	ZENER DIODE MTZJ12B
D5111	407 099 5501	ZENER DIODE MTZJ6.2C
D5112	407 004 9709	DIODE DSK10C
OR	407 005 8701	DIODE ERA15-02
D5113	407 004 9709	DIODE DSK10C
OR	407 005 8701	DIODE ERA15-02
	(CRYSTAL DEVICES)	
X1001	645 014 8378	OSC,CRYSTAL 4.433619MHZ
OR	645 002 4436	OSC,CRYSTAL 4.433619MHZ
OR	645 000 6029	OSC,CRYSTAL 4.433619MHZ
OR	645 000 6012	OSC,CRYSTAL 4.433619MHZ
X3001	645 007 8460	OSC,CERAMIC 8.500MHZ
OR	645 008 8360	OSC,CERAMIC 8.500MHZ
X3002	613 109 0972	OSC,CRYSTAL 32KHZ
OR	645 004 1938	OSC,CRYSTAL 32.768KHZ
	(VARIABLE RESISTORS)	
VR351	645 003 5166	VR,SEMI,220K N
OR	645 003 5593	VR,SEMI,220K N
OR	645 006 5538	VR,SEMI,220K N
	(INDUCTORS)	
L1002	645 001 4611	INDUCTOR 120U J
OR	645 003 7948	INDUCTOR,120U J
L1003	645 002 1510	INDUCTOR 68U J
OR	645 003 8228	INDUCTOR,68U J
L1006	645 001 4642	INDUCTOR 22U J
OR	645 003 8013	INDUCTOR,22U J
L1007	645 002 1411	INDUCTOR 10U J
OR	645 003 7894	INDUCTOR,10U J
L1101	645 008 7400	CORE,BEAD
OR	645 025 0644	INDUCTOR,0.75UH
L1102	645 009 3791	CORE,BEAD
L1363	645 006 3817	INDUCTOR,0.22U K,VR 2781 ONLY
L1401	645 001 5472	INDUCTOR 33U J
OR	645 003 8105	INDUCTOR,33U J
L1402	645 002 1497	INDUCTOR 56U J
OR	645 003 8181	INDUCTOR,56U J
L1404	645 002 1442	INDUCTOR,18U J
OR	645 003 7986	INDUCTOR,18U J
L2021	645 003 6934	INDUCTOR,100U J
OR	645 003 7634	INDUCTOR,100U J
L2022	645 020 7396	INDUCTOR,180U K,VR 2781 ONLY
L2371	645 008 7400	CORE,BEAD
L2372	645 008 7400	CORE,BEAD,VR 2781 ONLY
L2373	645 003 6934	INDUCTOR,100U J
OR	645 003 7634	INDUCTOR,100U J
L3001	645 009 3791	CORE,BEAD
L3003	645 009 3791	CORE,BEAD
L3301	645 001 4550	INDUCTOR 10U K
OR	645 003 7900	INDUCTOR,10U K
L3304	645 006 3886	INDUCTOR,1U K
OR	645 005 3856	INDUCTOR,1U M
L5001	S645 013 5620	LINE FILTER
L5010	645 006 3602	INDUCTOR,1.1UH
OR	645 024 3417	INDUCTOR,2.0UH
L5011	645 009 3791	CORE,BEAD
L5101	645 006 3602	INDUCTOR,1.1UH
OR	645 024 3417	INDUCTOR,2.0UH
L5102	645 006 3602	INDUCTOR,1.1UH
OR	645 024 3417	INDUCTOR,2.0UH
L5109	645 009 3791	CORE,BEAD
	(TRANSFORMERS)	
T2001	645 018 3515	TRANS,OSC,70KHZ
T2351	645 020 8973	TRANS,OSC,70KHZ,VR 2781 ONLY
T5001	⚠645 020 8676	TRANS,POWER,PULSE
	(CAPACITORS)	
C1001	403 191 8709	ELECT 1U M 50V
C1002	403 189 2405	ELECT 10U M 16V
C1003	403 135 4002	ELECT 47U M 6.3V
C1004	403 068 0409	CERAMIC 0.1U Z 25V
C1005	403 163 7907	ELECT 47U M 6.3V
C1006	403 068 0409	CERAMIC 0.1U Z 25V
C1007	403 191 8709	ELECT 1U M 50V
C1009	403 191 8709	ELECT 1U M 50V
C1010	403 014 9302	CERAMIC 180P J 50V
C1011	403 023 4503	CERAMIC 330P J 50V
C1012	403 020 0508	CERAMIC 27P J 50V
C1013	403 150 6500	ELECT 22U M 16V
C1014	403 069 5601	CERAMIC 0.01U K 50V

LOCATION	PARTS NO.	DESCRIPTION
C1015	403 022 8304	CERAMIC 33P J 50V
C1016	403 001 1906	CERAMIC 0.01U M 16V
C1017	403 001 1906	CERAMIC 0.01U M 16V
C1018	403 130 3109	CERAMIC 0.047U K 50V
C1019	403 191 8709	ELECT 1U M 50V
C1021	403 130 3109	CERAMIC 0.047U K 50V
C1022	403 109 6308	ELECT 1U M 50V
C1023	403 130 3109	CERAMIC 0.047U K 50V
C1024	403 192 5905	CERAMIC 0.1U K 25V
C1025	403 069 5601	CERAMIC 0.01U K 50V
C1026	403 191 8709	ELECT 1U M 50V
C1027	403 072 1607	CERAMIC 0.022U K 50V
C1028	403 191 8709	ELECT 1U M 50V
C1029	403 163 7907	ELECT 47U M 6.3V
C1030	403 068 0409	CERAMIC 0.1U Z 25V
C1031	403 069 5601	CERAMIC 0.01U K 50V
C1032	403 191 8709	ELECT 1U M 50V
C1033	403 014 3409	CERAMIC 18P J 50V
C1038	403 010 1102	CERAMIC 1000P J 50V
C1040	403 189 2405	ELECT 10U M 16V
C1041	403 020 0409	CERAMIC 27P J 50V
C1043	403 086 2805	NP-ELECT 1U M 50V,VR 2780 ONLY
C1044	403 026 2803	CERAMIC 47P J 50V,VR 2780 ONLY
C1046	403 001 3306	CERAMIC 1200P M 16V
C1047	403 028 4102	CERAMIC 56P J 50V
C1048	403 012 6907	CERAMIC 15P J 50V
C1050	403 012 6907	CERAMIC 15P J 50V
C1051	403 026 2803	CERAMIC 47P J 50V
C1052	403 026 2803	CERAMIC 47P J 50V,VR 2781 ONLY
C1101	403 191 8709	ELECT 1U M 50V
C1102	403 163 7907	ELECT 47U M 6.3V
C1103	403 068 0409	CERAMIC 0.1U Z 25V
C1104	403 069 5601	CERAMIC 0.01U K 50V
C1105	403 069 5601	CERAMIC 0.01U K 50V
C1106	403 069 5601	CERAMIC 0.01U K 50V
C1107	403 069 5601	CERAMIC 0.01U K 50V
C1108	403 192 5905	CERAMIC 0.1U K 25V
C1109	403 068 0409	CERAMIC 0.1U Z 25V
C1301	403 135 4101	ELECT 470U M 6.3V
C1302	403 068 0409	CERAMIC 0.1U Z 25V,VR 2781 ONLY
C1303	403 068 0409	CERAMIC 0.1U Z 25V
C1341	403 154 2102	NP-ELECT 1U M 50V,VR 2781 ONLY
C1342	403 068 0409	CERAMIC 0.1U Z 25V,VR 2781 ONLY
C1343	403 026 2902	CERAMIC 47P J 50V,VR 2781 ONLY
C1344	403 154 2102	NP-ELECT 1U M 50V,VR 2781 ONLY
C1346	403 107 9905	ELECT 10U M 16V,VR 2781 ONLY
C1351	403 107 9905	ELECT 10U M 16V,VR 2781 ONLY
C1352	403 086 2805	NP-ELECT 1U M 50V,VR 2781 ONLY
C1352	403 191 8709	ELECT 1U M 50V,VR 2780 ONLY
C1353	403 109 6308	ELECT 1U M 50V,VR 2781 ONLY
C1401	403 022 8205	CERAMIC 33P J 50V
C1403	403 109 6308	ELECT 1U M 50V
C1404	403 069 9500	CERAMIC 0.01U Z 50V
C1405	403 135 4002	ELECT 47U M 6.3V
C1406	403 018 0503	CERAMIC 22P J 50V
C1407	403 018 0503	CERAMIC 22P J 50V
C1410	403 009 5807	CERAMIC 100P J 50V
C1411	403 070 5508	CERAMIC 1200P K 50V
C1412	403 109 6308	ELECT 1U M 50V
C1414	403 014 3508	CERAMIC 18P J 50V
C2001	403 191 8709	ELECT 1U M 50V
C2002	403 069 5601	CERAMIC 0.01U K 50V,VR 2781 ONLY
C2002	403 069 1702	CERAMIC 1000P K 50V,VR 2780 ONLY
C2003	403 069 5601	CERAMIC 0.01U K 50V
C2004	403 189 2405	ELECT 10U M 16V
C2005	403 167 7002	ELECT 4.7U M 50V
C2006	403 068 0409	CERAMIC 0.1U Z 25V
C2007	403 167 7002	ELECT 4.7U M 50V
C2008	403 068 0409	CERAMIC 0.1U Z 25V
C2009	403 159 8109	ELECT 100U M 6.3V
C2010	403 167 6500	ELECT 33U M 6.3V
C2011	403 167 6500	ELECT 33U M 6.3V
C2012	403 068 0409	CERAMIC 0.1U Z 25V
C2013	403 189 2405	ELECT 10U M 16V
C2016	403 163 8409	ELECT 47U M 16V
C2017	403 075 5305	CERAMIC 8200P K 50V
C2018	403 069 5601	CERAMIC 0.01U K 50V
C2019	403 068 0409	CERAMIC 0.1U Z 25V,VR 2781 ONLY
C2021	403 075 4803	CERAMIC 820P K 50V
C2022	403 070 5508	CERAMIC 1200P K 50V
C2023	403 075 0706	CERAMIC 6800P K 50V
C2024	403 075 0706	CERAMIC 6800P K 50V
C2025	403 193 7809	ELECT 100U M 16V
C2026	403 081 3302	POLYPRO 0.022U J 100V
C2027	403 068 0409	CERAMIC 0.1U Z 25V
C2028	403 189 2405	ELECT 10U M 16V,VR 2781 ONLY
C2301	403 189 2405	ELECT 10U M 16V
C2302	403 189 2405	ELECT 10U M 16V
C2303	403 072 1607	CERAMIC 0.022U K 50V
C2304	403 072 1607	CERAMIC 0.022U K 50V
C2305	403 073 9107	CERAMIC 4700P K 50V
C2306	403 073 9107	CERAMIC 4700P K 50V
C2307	403 193 7809	ELECT 100U M 16V
C2308	403 193 7809	ELECT 100U M 16V
C2309	403 070 8806	CERAMIC 1500P K 50V
C2310	403 070 8806	CERAMIC 1500P K 50V
C2311	403 139 1502	ELECT 10U M 16V
C2312	403 139 1502	ELECT 10U M 16V
C2321	403 167 7002	ELECT 4.7U M 50V
C2323	403 193 7809	ELECT 100U M 16V
C2324	403 163 8409	ELECT 47U M 16V
C2325	403 072 1607	CERAMIC 0.022U K 50V
C2326	403 001 1906	CERAMIC 0.01U M 16V
C2327	403 139 1809	ELECT 47U M 16V
C2332	403 193 7809	ELECT 100U M 16V
C2351	403 134 9602	ELECT 47U M 16V,VR 2781 ONLY
C2352	403 069 5601	CERAMIC 0.01U K 50V,VR 2781 ONLY
C2353	403 069 5601	CERAMIC 0.01U K 50V,VR 2781 ONLY
C2354	403 081 7409	POLYPRO 0.033U J 100V,VR 2781 ONLY
C2361	403 069 0309	CERAMIC 1000P J 50V,VR 2781 ONLY
C2362	403 069 0309	CERAMIC 1000P J 50V,VR 2781 ONLY
C2363	403 069 1702	CERAMIC 1000P K 50V
C2364	403 069 1702	CERAMIC 1000P K 50V
C2365	403 018 7502	CERAMIC 220P J 50V
C2366	403 018 7502	CERAMIC 220P J 50V
C2367	403 069 1702	CERAMIC 1000P K 50V,VR 2781 ONLY
C2368	403 069 1702	CERAMIC 1000P K 50V,VR 2781 ONLY
C2369	403 018 7502	CERAMIC 220P J 50V,VR 2781 ONLY
C2370	403 018 7502	CERAMIC 220P J 50V,VR 2781 ONLY
C2371	403 134 9602	ELECT 47U M 16V,VR 2781 ONLY
C2372	403 071 8102	CERAMIC 2200P K 50V
C3001	403 018 0503	CERAMIC 22P J 50V
C3002	403 012 5900	CERAMIC 15P J 50V
C3004	403 069 5601	CERAMIC 0.01U K 50V
C3005	403 069 5601	CERAMIC 0.01U K 50V
C3008	403 150 6500	ELECT 22U M 16V
C3009	403 069 5601	CERAMIC 0.01U K 50V
C3011	403 068 0409	CERAMIC 0.1U Z 25V
C3012	403 069 5601	CERAMIC 0.01U K 50V
C3014	403 135 4101	ELECT 470U M 6.3V
C3016	403 069 5601	CERAMIC 0.01U K 50V
C3019	403 068 0409	CERAMIC 0.1U Z 25V
C3022	403 305 4801	DL-ELECT 0.1F Z 5.5V
C3034	403 069 5601	CERAMIC 0.01U K 50V
C3037	403 028 3402	CERAMIC 56P J 50V
C3040	403 009 5807	CERAMIC 100P J 50V
C3041	403 009 5807	CERAMIC 100P J 50V
C3042	403 009 5807	CERAMIC 100P J 50V
C3043	403 009 5807	CERAMIC 100P J 50V
C3301	403 107 9905	ELECT 10U M 16V
C3302	403 107 9905	ELECT 10U M 16V
C3303	403 024 7206	CERAMIC 390P J 50V
C3307	403 068 0409	CERAMIC 0.1U Z 25V
C3314	403 189 2405	ELECT 10U M 16V
C3318	403 011 5000	CERAMIC 120P J 50V
C3320	403 030 7009	CERAMIC 68P J 50V
C3324	403 121 9509	CERAMIC 0.1U Z 50V
C3325	403 068 0409	CERAMIC 0.1U Z 25V
C3404	403 193 8905	ELECT 22U M 50V
C3501	403 070 9803	CERAMIC 0.015U K 50V
C3502	403 075 0706	CERAMIC 6800P K 50V
C3503	403 070 9803	CERAMIC 0.015U K 50V
C3504	403 228 8207	ELECT 22U M 16V
C3505	403 228 8207	ELECT 22U M 16V

LOCATION	PARTS NO.	DESCRIPTION
C3506	403 075 0706	CERAMIC 6800P K 50V
C3507	403 150 6500	ELECT 22U M 16V
C3508	403 150 6500	ELECT 22U M 16V
C3509	403 163 7907	ELECT 47U M 6.3V
C3511	403 071 6504	CERAMIC 220P K 50V
C3512	403 056 9704	POLYESTER 0.01U J 50V
C3513	403 119 6701	CERAMIC 0.068U K 16V
C3514	403 184 9805	MT-POLYEST 0.22U J 50V
C3515	403 063 0206	POLYESTER 6800P K 50V
C3516	403 071 8102	CERAMIC 2200P K 50V
C3517	403 070 8806	CERAMIC 1500P K 50V
C3522	403 069 1207	CERAMIC 1000P K 50V
C3523	403 139 2707	ELECT 1U M 50V
C3524	403 069 5601	CERAMIC 0.01U K 50V
C3525	403 139 2608	ELECT 0.47U M 50V
C3526	403 063 7205	POLYESTER 0.082U J 50V
C3536	403 193 7601	ELECT 220U M 6.3V
C3540	403 009 5708	CERAMIC 100P J 50V
C3551	403 175 0903	MT-POLYEST 0.12U J 50V
C3552	403 028 4102	CERAMIC 56P J 50V
C3553	403 191 8709	ELECT 1U M 50V
C3554	403 013 3004	CERAMIC 150P J 50V
C3555	403 069 5601	CERAMIC 0.01U K 50V
C3556	403 069 1702	CERAMIC 1000P K 50V
C3558	403 167 6500	ELECT 33U M 6.3V
C3561	403 058 9306	POLYESTER 0.018U J 50V
C3562	403 138 5600	POLYESTER 5600P J 50V
C3570	403 070 2606	CERAMIC 0.1U Z 50V
C3571	403 070 2606	CERAMIC 0.1U Z 50V
C5001	⚠ 404 055 4905	MT-POLYEST 0.068U M 250V
C5002	⚠ 404 055 4905	MT-POLYEST 0.068U M 250V
C5005	⚠ 404 074 2104	CERAMIC 1000P M 250V
C5007	⚠ 404 074 2104	CERAMIC 1000P M 250V
C5010	403 249 0204	ELECT 47U M 400V
C5011	403 301 1101	ELECT 4.7U M 50V
C5012	403 076 2402	CERAMIC 3300P K 500V
C5013	403 255 8409	CERAMIC 39P J 1K
C5015	403 192 5905	CERAMIC 0.1U K 25V
C5017	403 024 7107	CERAMIC 390P J 50V
C5020	403 255 8508	CERAMIC 47P J 1K
C5021	403 076 0507	CERAMIC 2200P K 500V
C5025	403 255 8409	CERAMIC 39P J 1K
C5101	403 314 0207	ELECT 1000U M 16V
C5102	403 135 3302	ELECT 1000U M 6.3V
C5103	403 314 0108	ELECT 470U M 16V
C5104	403 125 5507	ELECT 1000U M 16V
C5105	403 304 9302	ELECT 47U M 50V
C5106	403 301 1309	ELECT 47U M 35V
C5107	403 301 1507	ELECT 220U M 6.3V
C5111	403 125 5606	ELECT 100U M 16V
C5112	403 189 2405	ELECT 10U M 16V
C5113	403 193 9001	ELECT 3.3U M 50V
C5114	403 107 9905	ELECT 10U M 16V
C5115	403 135 7805	ELECT 3.3U M 50V
C5116	403 107 9905	ELECT 10U M 16V
C5117	403 135 7805	ELECT 3.3U M 50V
C5118	403 189 2405	ELECT 10U M 16V
C5123	403 075 6906	CERAMIC 100P K 500V
C5124	403 108 0000	ELECT 0.22U M 50V
C5135	403 057 3107	POLYESTER 0.1U K 50V
	(RESISTORS)	
R1001	401 037 5400	MT-GLAZE 1K JA 1/10W
R1002	401 038 6406	MT-GLAZE 4.7K JA 1/10W
R1003	401 037 9200	MT-GLAZE 1.8K JA 1/10W
R1004	401 037 7909	MT-GLAZE 1.5K JA 1/10W
R1005	401 038 6307	MT-GLAZE 470 JA 1/10W
R1006	401 038 6307	MT-GLAZE 470 JA 1/10W
R1011	401 037 5400	MT-GLAZE 1K JA 1/10W
R1012	401 038 6505	MT-GLAZE 47K JA 1/10W
R1014	401 037 9200	MT-GLAZE 1.8K JA 1/10W
R1015	401 039 0403	MT-GLAZE 8.2K JA 1/10W
R1016	401 037 7909	MT-GLAZE 1.5K JA 1/10W
R1017	401 016 4707	CARBON 22K JA 1/4W
R1024	401 037 5400	MT-GLAZE 1K JA 1/10W
R1025	401 037 5004	MT-GLAZE 0.000 ZA 1/10W
R1028	401 038 0701	MT-GLAZE 2.2K JA 1/10W
R1032	401 037 5400	MT-GLAZE 1K JA 1/10W
R1033	401 018 2701	CARBON 330 JA 1/4W,VR 2780 ONLY
R1034	401 038 5003	MT-GLAZE 390 JA 1/10W,VR 2780 ONLY
R1040	401 037 5004	MT-GLAZE 0.000 ZA 1/10W
R1041	401 038 0701	MT-GLAZE 2.2K JA 1/10W
R1042	401 037 5004	MT-GLAZE 0.000 ZA 1/10W
R1045	401 037 7008	MT-GLAZE 1.2M JA 1/10W
R1046	401 037 5004	MT-GLAZE 0.000 ZA 1/10W
R1047	401 037 5004	MT-GLAZE 0.000 ZA 1/10W
R1048	401 037 5004	MT-GLAZE 0.000 ZA 1/10W
R1049	401 037 5004	MT-GLAZE 0.000 ZA 1/10W
R1101	401 038 0701	MT-GLAZE 2.2K JA 1/10W
R1102	401 038 0701	MT-GLAZE 2.2K JA 1/10W
R1104	401 015 2605	CARBON 1.8K JA 1/4W
R1301	401 019 0904	CARBON 390 JA 1/4W,VR 2780 ONLY
R1301	401 021 1807	CARBON 560 JA 1/4W,VR 2781 ONLY
R1303	401 022 6702	CARBON 75 JA 1/4W
R1304	401 037 5004	MT-GLAZE 0.000 ZA 1/10W,VR 2780 ONLY
R1309	401 022 1806	CARBON 680 JA 1/4W,VR 2781 ONLY
R1310	401 022 1806	CARBON 680 JA 1/4W,VR 2781 ONLY
R1311	401 038 4907	MT-GLAZE 39 JA 1/10W,VR 2781 ONLY
R1312	401 038 0602	MT-GLAZE 220 JA 1/10W
R1313	401 038 2002	MT-GLAZE 270 JA 1/10W,VR 2780 ONLY
R1314	401 038 3405	MT-GLAZE 33 JA 1/10W,VR 2781 ONLY
R1341	401 037 5400	MT-GLAZE 1K JA 1/10W,VR 2781 ONLY
R1342	401 012 5609	CARBON 1K JA 1/4W,VR 2781 ONLY
R1343	401 037 5202	MT-GLAZE 100 JA 1/10W,VR 2781 ONLY
R1344	401 037 5202	MT-GLAZE 100 JA 1/10W,VR 2781 ONLY
R1345	401 038 6406	MT-GLAZE 4.7K JA 1/10W,VR 2781 ONLY
R1346	401 038 6406	MT-GLAZE 4.7K JA 1/10W,VR 2781 ONLY
R1347	401 038 6406	MT-GLAZE 4.7K JA 1/10W,VR 2781 ONLY
R1348	401 038 6406	MT-GLAZE 4.7K JA 1/10W,VR 2781 ONLY
R1349	401 038 3504	MT-GLAZE 330 JA 1/10W,VR 2781 ONLY
R1350	401 038 5003	MT-GLAZE 390 JA 1/10W,VR 2781 ONLY
R1351	401 037 5004	MT-GLAZE 0.000 ZA 1/10W,VR 2781 ONLY
R1352	401 037 5004	MT-GLAZE 0.000 ZA 1/10W
R1404	401 038 3603	MT-GLAZE 3.3K JA 1/10W
R1405	401 038 0602	MT-GLAZE 220 JA 1/10W
R1408	401 038 2002	MT-GLAZE 270 JA 1/10W,VR 2781 ONLY
R1410	401 038 0602	MT-GLAZE 220 JA 1/10W
R1412	401 012 3308	CARBON 10 JA 1/4W
R2001	401 038 6406	MT-GLAZE 4.7K JA 1/10W
R2002	401 037 6803	MT-GLAZE 12K JA 1/10W
R2003	401 037 5400	MT-GLAZE 1K JA 1/10W,VR 2781 ONLY
R2003	401 037 6803	MT-GLAZE 12K JA 1/10W,VR 2780 ONLY
R2004	401 038 3801	MT-GLAZE 330K JA 1/10W
R2005	401 037 8500	MT-GLAZE 160 JA 1/10W
R2006	401 038 5102	MT-GLAZE 3.9K JA 1/10W
R2007	401 038 5102	MT-GLAZE 3.9K JA 1/10W
R2008	401 038 6406	MT-GLAZE 4.7K JA 1/10W
R2009	401 038 3900	MT-GLAZE 3.3M JA 1/10W
R2010	401 038 3702	MT-GLAZE 33K JA 1/10W
R2011	401 037 5608	MT-GLAZE 10K JA 1/10W
R2016	401 037 5004	MT-GLAZE 0.000 ZA 1/10W,VR 2781 ONLY
R2017	401 039 0403	MT-GLAZE 8.2K JA 1/10W
R2018	401 038 7700	MT-GLAZE 5.6K JA 1/10W,VR 2781 ONLY
R2021	401 038 2200	MT-GLAZE 27K JA 1/10W
R2022	401 037 9200	MT-GLAZE 1.8K JA 1/10W
R2023	401 037 5400	MT-GLAZE 1K JA 1/10W
R2024	401 038 6208	MT-GLAZE 47 JA 1/10W
R2025	401 011 8809	CARBON 1 JA 1/4W
R2026	401 038 0701	MT-GLAZE 2.2K JA 1/10W
R2027	401 038 0701	MT-GLAZE 2.2K JA 1/10W
R2028	401 037 9101	MT-GLAZE 180 JA 1/10W
R2029	401 037 5608	MT-GLAZE 10K JA 1/10W
R2030	401 038 0800	MT-GLAZE 22K JA 1/10W
R2031	401 037 5004	MT-GLAZE 0.000 ZA 1/10W,VR 2780 ONLY
R2031	401 089 8602	MT-GLAZE 4.7M JA 1/10W,VR 2781 ONLY
R2033	401 037 5608	MT-GLAZE 10K JA 1/10W,VR 2781 ONLY
R2301	401 020 1907	CARBON 4.7K JA 1/4W
R2302	401 020 1907	CARBON 4.7K JA 1/4W
R2303	401 038 2200	MT-GLAZE 27K JA 1/10W
R2304	401 038 2200	MT-GLAZE 27K JA 1/10W
R2305	401 038 3702	MT-GLAZE 33K JA 1/10W
R2306	401 038 3702	MT-GLAZE 33K JA 1/10W
R2309	401 038 6406	MT-GLAZE 4.7K JA 1/10W,VR 2781 ONLY
R2310	401 038 6406	MT-GLAZE 4.7K JA 1/10W,VR 2781 ONLY
R2313	401 037 5004	MT-GLAZE 0.000 ZA 1/10W

LOCATION	PARTS NO.	DESCRIPTION
R2314	401 037 5004	MT-GLAZE 0.000 ZA 1/10W
R2315	401 020 1907	CARBON 4.7K JA 1/4W,VR 2781 ONLY
R2316	401 020 1907	CARBON 4.7K JA 1/4W,VR 2781 ONLY
R2322	401 023 2703	CARBON 8.2K JA 1/4W
R2323	401 038 2200	MT-GLAZE 27K JA 1/10W
R2324	401 038 2200	MT-GLAZE 27K JA 1/10W
R2325	401 014 4006	CARBON 1.5K JA 1/4W
R2327	401 016 3700	CARBON 2.2K JA 1/4W
R2329	401 038 1005	MT-GLAZE 2.2M JA 1/10W
R2331	401 037 6704	MT-GLAZE 1.2K JA 1/10W
R2332	401 038 5102	MT-GLAZE 3.9K JA 1/10W
R2335	401 038 6406	MT-GLAZE 4.7K JA 1/10W
R2336	401 014 4006	CARBON 1.5K JA 1/4W
R2337	401 014 4006	CARBON 1.5K JA 1/4W
R2340	401 018 2701	CARBON 330 JA 1/4W
R2341	401 021 2903	CARBON 5.6K JA 1/4W
R2342	401 021 2903	CARBON 5.6K JA 1/4W
R2343	401 012 4404	CARBON 100 JA 1/4W
R2344	401 012 6903	CARBON 10K JA 1/4W
R2345	401 012 6903	CARBON 10K JA 1/4W
R2347	401 020 1907	CARBON 4.7K JA 1/4W
R2351	401 018 1506	CARBON 33 JA 1/4W,VR 2781 ONLY
R2352	401 038 6208	MT-GLAZE 47 JA 1/10W,VR 2781 ONLY
R2353	401 037 8005	MT-GLAZE 15K JA 1/10W,VR 2781 ONLY
R2354	401 037 5103	MT-GLAZE 10 JA 1/10W,VR 2781 ONLY
R2355	401 038 0800	MT-GLAZE 22K JA 1/10W,VR 2781 ONLY
R2356	401 038 3702	MT-GLAZE 33K JA 1/10W,VR 2781 ONLY
R2361	401 012 5609	CARBON 1K JA 1/4W,VR 2781 ONLY
R2362	401 012 5609	CARBON 1K JA 1/4W,VR 2781 ONLY
R2363	401 038 9001	MT-GLAZE 680 JA 1/10W
R2364	401 038 9001	MT-GLAZE 680 JA 1/10W
R2365	401 037 5400	MT-GLAZE 1K JA 1/10W
R2366	401 037 5400	MT-GLAZE 1K JA 1/10W
R2367	401 038 9001	MT-GLAZE 680 JA 1/10W,VR 2781 ONLY
R2368	401 038 9001	MT-GLAZE 680 JA 1/10W,VR 2781 ONLY
R2369	401 037 5400	MT-GLAZE 1K JA 1/10W,VR 2781 ONLY
R2370	401 037 5400	MT-GLAZE 1K JA 1/10W,VR 2781 ONLY
R2371	401 013 6308	CARBON 12K JA 1/4W,VR 2781 ONLY
R2372	401 023 2703	CARBON 8.2K JA 1/4W,VR 2781 ONLY
R2376	401 037 5400	MT-GLAZE 1K JA 1/10W,VR 2781 ONLY
R2377	401 037 5400	MT-GLAZE 1K JA 1/10W,VR 2781 ONLY
R2378	401 037 5400	MT-GLAZE 1K JA 1/10W,VR 2781 ONLY
R2379	401 038 5102	MT-GLAZE 3.9K JA 1/10W
R2380	401 038 9209	MT-GLAZE 6.8K JA 1/10W
R2381	401 037 5400	MT-GLAZE 1K JA 1/10W
R2391	401 038 9506	MT-GLAZE 75 JA 1/10W,VR 2781 ONLY
R2392	401 038 9506	MT-GLAZE 75 JA 1/10W,VR 2781 ONLY
R2393	401 038 6406	MT-GLAZE 4.7K JA 1/10W,VR 2781 ONLY
R2394	401 038 0701	MT-GLAZE 2.2K JA 1/10W,VR 2781 ONLY
R2396	401 038 9506	MT-GLAZE 75 JA 1/10W,VR 2780 ONLY
R3001	⚠ 402 067 7402	FUSIBLE RES 3.3 JA 1/2W
R3004	401 037 7909	MT-GLAZE 1.5K JA 1/10W
R3008	401 020 1907	CARBON 4.7K JA 1/4W
R3009	401 023 1607	CARBON 820 JA 1/4W
R3011	401 020 2805	CARBON 47K JA 1/4W
R3013	401 038 6406	MT-GLAZE 4.7K JA 1/10W
R3014	401 014 9001	CARBON 16K JA 1/4W
R3015	401 014 9001	CARBON 16K JA 1/4W
R3018	401 038 9209	MT-GLAZE 6.8K JA 1/10W
R3019	401 037 9309	MT-GLAZE 18K JA 1/10W
R3023	401 037 5400	MT-GLAZE 1K JA 1/10W
R3024	401 037 5400	MT-GLAZE 1K JA 1/10W
R3025	401 037 5400	MT-GLAZE 1K JA 1/10W
R3026	401 037 5400	MT-GLAZE 1K JA 1/10W
R3032	401 018 4804	CARBON 33K JA 1/4W
R3036	401 016 3700	CARBON 2.2K JA 1/4W
R3037	401 038 5300	MT-GLAZE 39K JA 1/10W
R3047	401 037 9200	MT-GLAZE 1.8K JA 1/10W
R3048	401 037 6704	MT-GLAZE 1.2K JA 1/10W
R3049	401 038 2101	MT-GLAZE 2.7K JA 1/10W
R3050	401 016 4707	CARBON 22K JA 1/4W
R3051	401 016 4707	CARBON 22K JA 1/4W
R3057	401 016 3700	CARBON 2.2K JA 1/4W
R3058	401 016 3700	CARBON 2.2K JA 1/4W
R3059	401 012 6903	CARBON 10K JA 1/4W
R3101	401 012 6903	CARBON 10K JA 1/4W
R3102	401 012 6903	CARBON 10K JA 1/4W
R3103	401 012 6903	CARBON 10K JA 1/4W
R3104	401 012 6903	CARBON 10K JA 1/4W
R3301	401 038 5003	MT-GLAZE 390 JA 1/10W
R3302	401 037 7909	MT-GLAZE 1.5K JA 1/10W
R3309	⚠ 402 078 2908	FUSIBLE RES 680 GA 1/4W
R3501	401 012 8006	CARBON 100K JA 1/4W
R3502	401 037 5707	MT-GLAZE 100K JA 1/10W
R3503	401 038 3801	MT-GLAZE 330K JA 1/10W
R3504	401 014 6000	CARBON 150K JA 1/4W
R3505	401 014 5102	CARBON 15K JA 1/4W
R3506	401 038 0909	MT-GLAZE 220K JA 1/10W
R3507	401 014 6000	CARBON 150K JA 1/4W
R3508	401 017 2702	CARBON 27K JA 1/4W
R3516	401 039 1004	MT-GLAZE 9.1K JA 1/10W
R3517	401 038 6505	MT-GLAZE 47K JA 1/10W
R3518	401 020 2805	CARBON 47K JA 1/4W
R3519	401 038 3801	MT-GLAZE 330K JA 1/10W
R3520	401 038 5409	MT-GLAZE 390K JA 1/10W
R3521	401 037 5608	MT-GLAZE 10K JA 1/10W
R3525	401 012 5609	CARBON 1K JA 1/4W
R3526	401 038 0701	MT-GLAZE 2.2K JA 1/10W
R3527	401 037 5400	MT-GLAZE 1K JA 1/10W
R3528	401 020 7800	CARBON 510 JA 1/4W
R3529	401 020 7800	CARBON 510 JA 1/4W
R3537	401 039 0403	MT-GLAZE 8.2K JA 1/10W
R3546	401 020 1907	CARBON 4.7K JA 1/4W
R3547	401 037 8005	MT-GLAZE 15K JA 1/10W
R3549	401 037 5608	MT-GLAZE 10K JA 1/10W
R3550	401 039 0403	MT-GLAZE 8.2K JA 1/10W
R3551	401 037 5608	MT-GLAZE 10K JA 1/10W
R3552	401 037 5707	MT-GLAZE 100K JA 1/10W
R3553	401 016 5704	CARBON 220K JA 1/4W
R3555	401 037 5707	MT-GLAZE 100K JA 1/10W
R3556	401 037 5608	MT-GLAZE 10K JA 1/10W
R3557	401 038 3801	MT-GLAZE 330K JA 1/10W
R3558	401 038 6307	MT-GLAZE 470 JA 1/10W
R3560	401 037 5400	MT-GLAZE 1K JA 1/10W
R5001	402 013 9108	SOLID 2.7M KB 1/2W
R5002	401 037 9101	MT-GLAZE 180 JA 1/10W
R5003	401 037 9200	MT-GLAZE 1.8K JA 1/10W
R5004	401 038 3801	MT-GLAZE 330K JA 1/10W
R5005	401 037 5004	MT-GLAZE 0.000 ZA 1/10W
R5006	401 037 5608	MT-GLAZE 10K JA 1/10W
R5007	401 038 0800	MT-GLAZE 22K JA 1/10W
R5009	401 038 9308	MT-GLAZE 68K JA 1/10W
R5010	401 019 3905	CARBON 390K JA 1/4W
R5011	401 019 3905	CARBON 390K JA 1/4W
R5020	401 069 4402	OXIDE-MT 68K JA 2W
R5021	401 069 4402	OXIDE-MT 68K JA 2W
R5101	401 018 2701	CARBON 330 JA 1/4W
R5102	401 038 5003	MT-GLAZE 390 JA 1/10W
R5103	401 021 1807	CARBON 560 JA 1/4W
R5104	401 018 3708	CARBON 3.3K JA 1/4W
R5105	401 016 2505	CARBON 220 JA 1/4W
R5106	401 020 0702	CARBON 470 JA 1/4W
R5108	401 037 9200	MT-GLAZE 1.8K JA 1/10W
R5109	401 018 3708	CARBON 3.3K JA 1/4W
R5110	⚠ 402 071 3100	FUSIBLE RES 27 JA 1/4W
R5111	401 020 7800	CARBON 510 JA 1/4W
R5112	401 038 5102	MT-GLAZE 3.9K JA 1/10W
R5114	401 038 6208	MT-GLAZE 47 JA 1/10W
R5120	⚠ 402 004 2705	FUSIBLE RES 8.2 JA 1/4W
R5121	401 015 7709	CARBON 2.7 JA 1/4W
R5123	401 015 2605	CARBON 1.8K JA 1/4W
R5132	401 018 3708	CARBON 3.3K JA 1/4W
R5133	401 023 2703	CARBON 8.2K JA 1/4W
R5134	401 018 3708	CARBON 3.3K JA 1/4W
R5135	401 037 6605	MT-GLAZE 120 JA 1/10W
	(JUMPERS)	
	401 037 5004	MT-GLAZE 0.000 ZA 1/10W
	(FUSES)	
F5001	⚠ 423 025 9900	FUSE 250V 2.5A
OR	⚠ 423 021 8402	FUSE 250V 2.5A
	(PROTECTORS)	
PR511	⚠ 645 005 9858	PROTECTOR,IC 0.8A 50V
PR512	⚠ 645 014 2529	PROTECTOR,1.25A 125V
	(JACKS)	
JK231	645 012 4068	JACK,RCA (N.S.P),,VR 2781 ONLY

LOCATION	PARTS NO.	DESCRIPTION
JK232	645 012 4051	JACK,RCA (N.S.P),VR 2781 ONLY
	(MISCELLANEOUS)	
	613 053 8048	FIXER
	645 008 7677	HOLDER,FUSE,F5001
OR	645 008 7660	HOLDER,FUSE,F5001
OR	645 016 0479	HOLDER,FUSE,F5001

COMPL PWB,VP-1

613 172 9162

LOCATION	PARTS NO.	DESCRIPTION
	(CONNECTORS)	
CN182	645 005 4204	SOCKET,12P (N.S.P)
OR	645 009 4163	SOCKET,FFC 12P (N.S.P)
	(INTEGRATED CIRCUITS)	
IC181	409 391 5401	IC LA70012L
IC291	409 326 0808	IC LA7256
	(INDUCTORS)	
L2901	645 003 7627	INDUCTOR,10U J
OR	645 003 6910	INDUCTOR,10U J
	(CAPACITORS)	
C1802	403 073 9107	CERAMIC 4700P K 50V
C1805	403 068 0409	CERAMIC 0.1U Z 25V
C1806	403 069 5601	CERAMIC 0.01U K 50V
C1807	403 163 7907	ELECT 47U M 6.3V
C1808	403 068 0409	CERAMIC 0.1U Z 25V
C1809	403 191 8709	ELECT 1U M 50V
C1810	403 069 5601	CERAMIC 0.01U K 50V
C1811	403 069 5601	CERAMIC 0.01U K 50V
C1812	403 018 0602	CERAMIC 22P J 50V
C1813	403 018 0602	CERAMIC 22P J 50V
C1814	403 018 0602	CERAMIC 22P J 50V
C1815	403 018 0602	CERAMIC 22P J 50V
C1835	403 069 5601	CERAMIC 0.01U K 50V
C1836	403 072 1607	CERAMIC 0.022U K 50V
C2901	403 193 7601	ELECT 220U M 6.3V
C2902	403 068 0409	CERAMIC 0.1U Z 25V
C2903	403 068 0409	CERAMIC 0.1U Z 25V
C2904	403 068 0409	CERAMIC 0.1U Z 25V
C2905	403 068 0409	CERAMIC 0.1U Z 25V
C2906	403 068 0409	CERAMIC 0.1U Z 25V
C2907	403 068 0409	CERAMIC 0.1U Z 25V
C2908	403 068 0409	CERAMIC 0.1U Z 25V
C2910	403 068 0409	CERAMIC 0.1U Z 25V
C2911	403 068 0409	CERAMIC 0.1U Z 25V
	(RESISTORS)	
R1801	401 038 5102	MT-GLAZE 3.9K JA 1/10W
R1802	401 038 0701	MT-GLAZE 2.2K JA 1/10W
R1804	401 038 9001	MT-GLAZE 680 JA 1/10W
R1805	401 038 9001	MT-GLAZE 680 JA 1/10W
R1806	401 038 6406	MT-GLAZE 4.7K JA 1/10W
R1807	401 037 5400	MT-GLAZE 1K JA 1/10W
R1808	401 037 5400	MT-GLAZE 1K JA 1/10W
R1831	401 037 5004	MT-GLAZE 0.000 ZA 1/10W
R1833	401 037 5004	MT-GLAZE 0.000 ZA 1/10W
R2901	401 037 7909	MT-GLAZE 1.5K JA 1/10W
R2902	401 038 0206	MT-GLAZE 20K JA 1/10W
R2903	401 037 5400	MT-GLAZE 1K JA 1/10W
R2904	401 037 5400	MT-GLAZE 1K JA 1/10W
	(JUMPERS)	
	401 037 5004	MT-GLAZE 0.000 ZA 1/10W

COMPL PWB,TM-1

613 179 6645 VR 2781 ONLY
613 179 6621 VR 2780 ONLY

LOCATION	PARTS NO.	DESCRIPTION
	(CONNECTORS)	
CN714	645 009 4408	SOCKET,FFC 35P (N.S.P),VR 2781 ONLY
OR	645 005 4808	SOCKET,35P (N.S.P),VR 2781 ONLY
CN714	645 009 4361	SOCKET,FFC 31P (N.S.P),VR 2780 ONLY
OR	645 005 4761	SOCKET,31P (N.S.P),VR 2780 ONLY
	(SEMICONDUCTORS)	
Q7101	405 000 3103	TR DTC114ES,VR 2781 ONLY
Q7102	405 000 3103	TR DTC114ES,VR 2781 ONLY
Q7103	405 000 3103	TR DTC114ES,VR 2781 ONLY
Q7104	405 000 3103	TR DTC114ES,VR 2781 ONLY

LOCATION	PARTS NO.	DESCRIPTION
	(DIODES)	
D7101	407 012 4406	DIODE 1SS133
D7102	407 012 4406	DIODE 1SS133
D7103	407 012 4406	DIODE 1SS133
D7104	407 012 4406	DIODE 1SS133
D7108	408 035 5203	LED SEL2413EM-TP2-D, PLAY-LED, VR 2781 ONLY
D7109	408 035 5203	LED SEL2413EM-TP2-D, FF-LED,VR 2781 ONLY
D7110	408 035 5203	LED SEL2413EM-TP2-D, REW-LED, VR 2781 ONLY
D7111	407 198 0704	LED L-474GT-TNB5/6-P, DMSS-LED, VR 2781 ONLY
OR	407 154 9406	LED SEL2413E-D, DMSS-LED,VR 2781 ONLY
D7118	408 035 5203	LED SEL2413EM-TP2-D, PLAY-LED, VR 2781 ONLY
	(CAPACITORS)	
C7101	403 167 7002	ELECT 4.7U M 50V
	(RESISTORS)	
R7101	401 015 1509	CARBON 180 JA 1/4W,VR 2781 ONLY
R7102	401 015 1509	CARBON 180 JA 1/4W,VR 2781 ONLY
R7103	401 015 1509	CARBON 180 JA 1/4W,VR 2781 ONLY
R7105	401 016 2505	CARBON 220 JA 1/4W,VR 2781 ONLY
R7120	401 015 1509	CARBON 180 JA 1/4W,VR 2781 ONLY
	(SWITCHES)	
S7101	645 008 8049	SWITCH,PUSH 1P-1T, POWER
OR	645 006 2797	SWITCH,PUSH 1P-1T, POWER
OR	645 001 9777	SWITCH,PUSH 1P-1T, POWER
S7103	645 008 8049	SWITCH,PUSH 1P-1T, CH-UP
OR	645 006 2797	SWITCH,PUSH 1P-1T, CH-UP
OR	645 001 9777	SWITCH,PUSH 1P-1T, CH-UP
S7104	645 008 8049	SWITCH,PUSH 1P-1T, CH-DOWN
OR	645 006 2797	SWITCH,PUSH 1P-1T, CH-DOWN
OR	645 001 9777	SWITCH,PUSH 1P-1T, CH-DOWN
S7105	645 008 8049	SWITCH,PUSH 1P-1T, REC
OR	645 006 2797	SWITCH,PUSH 1P-1T, REC
OR	645 001 9777	SWITCH,PUSH 1P-1T, REC
S7106	645 008 8049	SWITCH,PUSH 1P-1T, DMSS
OR	645 006 2797	SWITCH,PUSH 1P-1T, DMSS
OR	645 001 9777	SWITCH,PUSH 1P-1T, DMSS
S7108	645 008 8049	SWITCH,PUSH 1P-1T, FF
OR	645 006 2797	SWITCH,PUSH 1P-1T, FF
OR	645 001 9777	SWITCH,PUSH 1P-1T, FF
S7109	645 008 8049	SWITCH,PUSH 1P-1T, REW
OR	645 006 2797	SWITCH,PUSH 1P-1T, REW
OR	645 001 9777	SWITCH,PUSH 1P-1T, REW
S7110	645 008 8049	SWITCH,PUSH 1P-1T, STOP/EJECT
OR	645 006 2797	SWITCH,PUSH 1P-1T, STOP/EJECT
OR	645 001 9777	SWITCH,PUSH 1P-1T, STOP/EJECT
S7111	645 008 8049	SWITCH,PUSH 1P-1T, PLAY
OR	645 006 2797	SWITCH,PUSH 1P-1T, PLAY
OR	645 001 9777	SWITCH,PUSH 1P-1T, PLAY
	(REMOTE RECEIVERS)	
RR711	645 021 5384	UNIT,IR RECEIVER PACK
OR	645 027 2332	UNIT,IR RECEIVER PACK
	(DISPLAYS)	
A7101	645 020 9437	FLUORESCENT TUBE
OR	645 004 0597	FLUORESCENT TUBE
	(MISCELLANEOUS)	
	613 163 1700	HOLDER IR, RR711
OR	613 173 7488	HOLDER,IR,RR711
	613 139 2267	HOLDER FL, FL
	613 171 5639	HOLDER LED 2P, DMSS,VR 2781 ONLY

COMPL PCB,TM-9

613 158 5751

LOCATION	PARTS NO.	DESCRIPTION
	(CONNECTORS)	
CN771	613 113 3853	CONNECTOR,5P (N.S.P)
OR	645 003 0840	PLUG,5P (N.S.P)
	(INTEGRATED CIRCUITS)	
IC771	409 340 9600	IC SDA5649
OR	409 380 8604	IC SDA5650
	(CAPACITORS)	
C7701	403 060 7505	POLYESTER 0.033U J 50V
C7702	403 071 8102	CERAMIC 2200P K 50V
C7703	403 256 4608	MT-COMPO 0.33U J 50V

LOCATION	PARTS NO.	DESCRIPTION
C7704	403 013 3004	CERAMIC 150P J 50V
C7705	403 068 0409	CERAMIC 0.1U Z 25V
C7706	403 129 0409	CERAMIC 0.01U K 16V
	(RESISTORS)	
R7701	401 038 9209	MT-GLAZE 6.8K JA 1/10W
R7702	401 037 7008	MT-GLAZE 1.2M JA 1/10W
R7703	401 038 9209	MT-GLAZE 6.8K JA 1/10W
R7704	401 037 7008	MT-GLAZE 1.2M JA 1/10W
R7705	401 037 5806	MT-GLAZE 1M JA 1/10W
R7706	401 038 0701	MT-GLAZE 2.2K JA 1/10W
R7707	401 037 5707	MT-GLAZE 100K JA 1/10W
R7708	401 037 5608	MT-GLAZE 10K JA 1/10W

COMPL PWB,TB-2

613 179 6614 VR 2781 ONLY

LOCATION	PARTS NO.	DESCRIPTION
	(CONNECTORS)	
CN722	645 003 1762	SOCKET,RIBBON 5P (N.S.P),VR 2781 ONLY
	(CAPACITORS)	
C7201	403 071 5408	CERAMIC 220P J 50V,VR 2781 ONLY
C7202	403 071 5408	CERAMIC 220P J 50V,VR 2781 ONLY
	(RESISTORS)	
R7201	401 022 6702	CARBON 75 JA 1/4W,VR 2781 ONLY
R7202	401 012 5609	CARBON 1K JA 1/4W,VR 2781 ONLY
R7203	401 012 5609	CARBON 1K JA 1/4W,VR 2781 ONLY
	(JACKS)	
JK721	645 025 7735	JACK,RCA-3 (N.S.P), VD/AD.IN,VR 2781 ONLY

COMPL PWB,TN-3

613 173 4470

LOCATION	PARTS NO.	DESCRIPTION
	(CONNECTORS)	
CN631	645 003 0925	PLUG,11P (N.S.P)
	(SEMICONDUCTORS)	
Q6301	405 011 8500	TR 2SC1740S-R
OR	405 099 8607	TR 2SC4640T
OR	405 093 0607	TR KSC2785-Y
OR	405 011 8401	TR 2SC1740S-Q
OR	405 099 8508	TR 2SC4640S
	(INTEGRATED CIRCUITS)	
IC631	409 370 6504	IC TDA9840
IC632	409 002 5905	IC BA403
	(CRYSTAL DEVICES)	
X6301	645 002 0711	OSC,CRYSTAL 10MHZ
	(CERAMIC RESONATORS)	
XF631	645 020 7914	DISCR,CERAMIC 5.74MHZ
XF632	645 006 3022	CERAMIC FILTER 5.742MHZ
	(VARIABLE RESISTORS)	
VR631	645 001 9487	VR,SEMI 22K N
OR	645 003 5692	VR,SEMI,22K N
	(INDUCTORS)	
L6301	645 003 7955	INDUCTOR,15U J
OR	645 002 1428	INDUCTOR 15U J
L6302	645 003 6910	INDUCTOR,10U J
OR	645 003 7627	INDUCTOR,10U J
L6303	645 003 6910	INDUCTOR,10U J
OR	645 003 7627	INDUCTOR,10U J
	(TRANSFORMERS)	
T6301	645 020 7921	TRANS,IF 54.7MHZ
	(CAPACITORS)	
C6301	403 009 1809	CERAMIC 10P J 50V
C6302	403 024 1501	CERAMIC 39P J 50V
C6303	403 001 1906	CERAMIC 0.01U M 16V
C6304	403 001 1906	CERAMIC 0.01U M 16V
C6305	403 107 9905	ELECT 10U M 16V
C6306	403 001 1906	CERAMIC 0.01U M 16V
C6307	403 125 5606	ELECT 100U M 16V
C6308	403 134 8100	ELECT 100U M 6.3V
C6309	403 001 1906	CERAMIC 0.01U M 16V
C6310	403 001 1906	CERAMIC 0.01U M 16V
C6311	403 001 1906	CERAMIC 0.01U M 16V
C6312	403 121 3507	ELECT 4.7U M 50V
C6313	403 121 3507	ELECT 4.7U M 50V
C6314	403 107 9905	ELECT 10U M 16V
C6315	403 001 1906	CERAMIC 0.01U M 16V
C6316	403 121 9509	CERAMIC 0.1U Z 50V
C6317	403 026 2209	CERAMIC 47P J 50V
C6318	403 134 8100	ELECT 100U M 6.3V
C6319	403 107 9905	ELECT 10U M 16V
C6320	403 107 9905	ELECT 10U M 16V
C6321	403 001 5102	CERAMIC 2200P M 16V
	(RESISTORS)	
R6301	401 014 4006	CARBON 1.5K JA 1/4W
R6303	401 018 2701	CARBON 330 JA 1/4W
R6304	401 021 1807	CARBON 560 JA 1/4W
R6305	401 012 5609	CARBON 1K JA 1/4W
R6306	401 012 5609	CARBON 1K JA 1/4W
R6307	401 013 6308	CARBON 12K JA 1/4W
R6308	401 023 2703	CARBON 8.2K JA 1/4W
R6311	401 020 1907	CARBON 4.7K JA 1/4W
R6312	401 012 6903	CARBON 10K JA 1/4W
R6313	401 017 2702	CARBON 27K JA 1/4W

COMPL PWB,AD-5

613 176 3982 VR 2781 ONLY

LOCATION	PARTS NO.	DESCRIPTION
	(CONNECTORS)	
CN251	645 007 6336	PLUG,7P (N.S.P),VR 2781 ONLY
	(SEMICONDUCTORS)	
Q2501	405 014 4608	TR 2SC2412K-S,VR 2781 ONLY
OR	405 014 4509	TR 2SC2412K-R,VR 2781 ONLY
OR	405 015 8704	TR 2SC2812-L6,VR 2781 ONLY
OR	405 015 8407	TR 2SC2812-L5,VR 2781 ONLY
Q2502	405 015 8407	TR 2SC2812-L5,VR 2781 ONLY
OR	405 014 4608	TR 2SC2412K-S,VR 2781 ONLY
OR	405 014 4509	TR 2SC2412K-R,VR 2781 ONLY
OR	405 015 8704	TR 2SC2812-L6,VR 2781 ONLY
	(INTEGRATED CIRCUITS)	
IC251	409 378 7107	IC LC85401E,VR 2781 ONLY
IC252	409 123 4306	IC LM33256N-15,VR 2781 ONLY
OR	409 314 8403	IC LC32256P-80,VR 2781 ONLY
OR	409 235 1408	IC LM33256G-10,VR 2781 ONLY
OR	409 158 1400	IC LM33256G-12,VR 2781 ONLY
	(CRYSTAL DEVICES)	
X2501	645 011 5431	OSC,CERAMIC 18.43MHZ,VR 2781 ONLY
	(CAPACITORS)	
C2501	403 215 3109	CERAMIC 0.1U Z 16V,VR 2781 ONLY
C2502	403 107 9905	ELECT 10U M 16V,VR 2781 ONLY
C2503	403 134 8100	ELECT 100U M 6.3V,VR 2781 ONLY
C2504	403 069 9500	CERAMIC 0.01U Z 50V,VR 2781 ONLY
C2505	403 134 8100	ELECT 100U M 6.3V,VR 2781 ONLY
C2506	403 069 9500	CERAMIC 0.01U Z 50V,VR 2781 ONLY
C2508	403 121 2401	ELECT 22U M 16V,VR 2781 ONLY
C2509	403 121 3408	ELECT 2.2U M 50V,VR 2781 ONLY
C2510	403 001 7908	CERAMIC 0.047U K 16V,VR 2781 ONLY
C2511	403 010 1102	CERAMIC 1000P J 50V,VR 2781 ONLY
C2512	403 010 1102	CERAMIC 1000P J 50V,VR 2781 ONLY
C2513	403 071 8102	CERAMIC 2200P K 50V,VR 2781 ONLY
C2514	403 069 9500	CERAMIC 0.01U Z 50V,VR 2781 ONLY
C2515	403 010 1102	CERAMIC 1000P J 50V,VR 2781 ONLY
C2517	403 010 1102	CERAMIC 1000P J 50V,VR 2781 ONLY
C2518	403 135 4002	ELECT 47U M 6.3V,VR 2781 ONLY
C2519	403 069 1702	CERAMIC 1000P K 50V,VR 2781 ONLY
C2520	403 073 4201	CERAMIC 3900P K 50V,VR 2781 ONLY
C2524	403 107 9905	ELECT 10U M 16V,VR 2781 ONLY
C2525	403 022 8205	CERAMIC 33P J 50V,VR 2781 ONLY
	(RESISTORS)	
R2501	401 038 3603	MT-GLAZE 3.3K JA 1/10W,VR 2781 ONLY
R2502	401 038 3702	MT-GLAZE 33K JA 1/10W,VR 2781 ONLY
R2503	401 037 5608	MT-GLAZE 10K JA 1/10W,VR 2781 ONLY
R2504	401 037 5400	MT-GLAZE 1K JA 1/10W,VR 2781 ONLY
R2505	401 038 6406	MT-GLAZE 4.7K JA 1/10W,VR 2781 ONLY
R2506	401 038 6406	MT-GLAZE 4.7K JA 1/10W,VR 2781 ONLY
R2507	401 164 7407	MT-FILM 1.8K DU 1/10W,VR 2781 ONLY
R2508	401 165 1305	MT-FILM 68K DU 1/10W,VR 2781 ONLY
R2509	401 164 7100	MT-FILM 1.5K DU 1/10W,VR 2781 ONLY
R2510	401 037 5608	MT-GLAZE 10K JA 1/10W,VR 2781 ONLY
R2511	401 038 0909	MT-GLAZE 220K JA 1/10W,VR 2781 ONLY
R2512	401 038 6505	MT-GLAZE 47K JA 1/10W,VR 2781 ONLY
R2513	401 037 5400	MT-GLAZE 1K JA 1/10W,VR 2781 ONLY
R2514	401 037 9309	MT-GLAZE 18K JA 1/10W,VR 2781 ONLY
R2515	401 038 0909	MT-GLAZE 220K JA 1/10W,VR 2781 ONLY

LOCATION	PARTS NO.	DESCRIPTION
R2516	401 037 5608	MT-GLAZE 10K JA 1/10W,VR 2781 ONLY
R2517	401 038 7908	MT-GLAZE 560K JA 1/10W,VR 2781 ONLY
R2518	401 037 5400	MT-GLAZE 1K JA 1/10W,VR 2781 ONLY
R2519	401 037 5608	MT-GLAZE 10K JA 1/10W,VR 2781 ONLY
R2521	401 037 5707	MT-GLAZE 100K JA 1/10W,VR 2781 ONLY
R2526	401 037 6803	MT-GLAZE 12K JA 1/10W,VR 2781 ONLY
R2527	401 037 6803	MT-GLAZE 12K JA 1/10W,VR 2781 ONLY
R2529	401 038 3702	MT-GLAZE 33K JA 1/10W,VR 2781 ONLY
	(JUMPERS)	
	401 037 5004	MT-GLAZE 0.000 ZA 1/10W,VR 2781 ONLY
	(FUSES)	
F2501	610 247 3322	FILTER,EMI 22000PF,VR 2781 ONLY

COMPL PWB,MC-1

613 173 9451

	(CONNECTORS)		
CN801	645 007 8446	SOCKET,12P	(N.S.P)
	(CAPACITORS)		
C8001	403 121 9509	CERAMIC	0.1U Z 50V
	(RESISTORS)		
R8001	401 015 2605	CARBON	1.8K JA 1/4W
R8002	401 023 1607	CARBON	820 JA 1/4W
R8003	401 017 0708	CARBON	270 JA 1/4W
R8004	401 014 2804	CARBON	150 JA 1/4W
	(SWITCHES)		
S8002	645 009 3388	SWITCH,DETECTOR 1P-1T,	
OR	645 003 4589	SWITCH,DETECTOR 1P-1T,	
	(MISCELLANEOUS)		
	613 152 4002	SPACER,MC1	

FLEXIBLE FLAT CABLE

645 017 0645	FLEXIBLE FLAT CABLE,VR 2780 ONLY
645 017 0652	FLEXIBLE FLAT CABLE,VR 2781 ONLY

VR 2780
VR 2781

BLOCK DIAGRAMS,CIRCUIT DIAGRAMS & PRINTED WIRING BOARDS

TABLE OF CONTENTS

Page

1. OVERALL WIRING, MECHANISM CONNECTION & BLOCK DIAGRAMS

OVERALL WIRING 1
MECHANISM CONNECTION 3
SYSTEM CONTROL & SERVO CIRCUIT 4
VIDEO CIRCUIT 7
AUDIO CIRCUIT 7
TERMINAL INPUT / OUTPUT SELECTOR CIRCUIT (VR 2781 ONLY) 9

2. CIRCUIT DIAGRAMS & PRINTED WIRING BOARDS (P.W.B.)

CP-1 BOARD (PW-A) POWER SUPPLY 11
CP-1 BOARD (VA-A) VIDEO & AUDIO 13
VP-1 BOARD VIDEO PRE-AMP 15
VIDEO CIRCUIT WAVEFORMS 17
VP-1 P.W.B. 17
AD-5 BOARD DMSS PROCESS (VR 2781 ONLY) 18
AD–5 P.W.B. (VR 2781 ONLY) 20
TM-1 P.W.B. 21
TM-1 & TB-2 BOARDS OPERATION KEY & DISPLAY 21
TB-2 P.W.B. (VR 2781 ONLY) 23
A7101 DISPLAY (FLD) GRID / ANODE ASSIGNMENT DRAWING & TABLE 23
CP-1 BOARD (SV-A) SERVO 24
SERVO CIRCUIT WAVEFORMS 26
TN-3 P.W.B. 27
TN-3 BOARD MTS DECODER 27
IC301 SYSTEM CONTROL, TIMER & TUNING CONTROL MPU PIN FUNCTIONS TABLE 27
CP-1 BOARD (SY-A) SYSTEM CONTROL, TIMER & TUNER 28
CP-1 P.W.B. 30
CP-1 BOARD (AD-A) HIFI AUDIO 33
TM-9 BOARD PDC/VPS 36
TM-9 P.W.B. 36

MP4HN/GQU3,GQU2 7BN

REFERENCE No.SM531617

NOTES:

1. All resistance values in "OHMS" unless otherwise noted.
   (K=1,000 ; M=1,000,000)
2. All capacitance values in "μF" unless otherwise noted.
   p=pico farad ; μ ,u or U=micro farad
3. All inductance values in "μH" unless otherwise noted.
   μ ,u or U=micro henry ; m=milli henry

PRODUCT SAFETY NOTICE

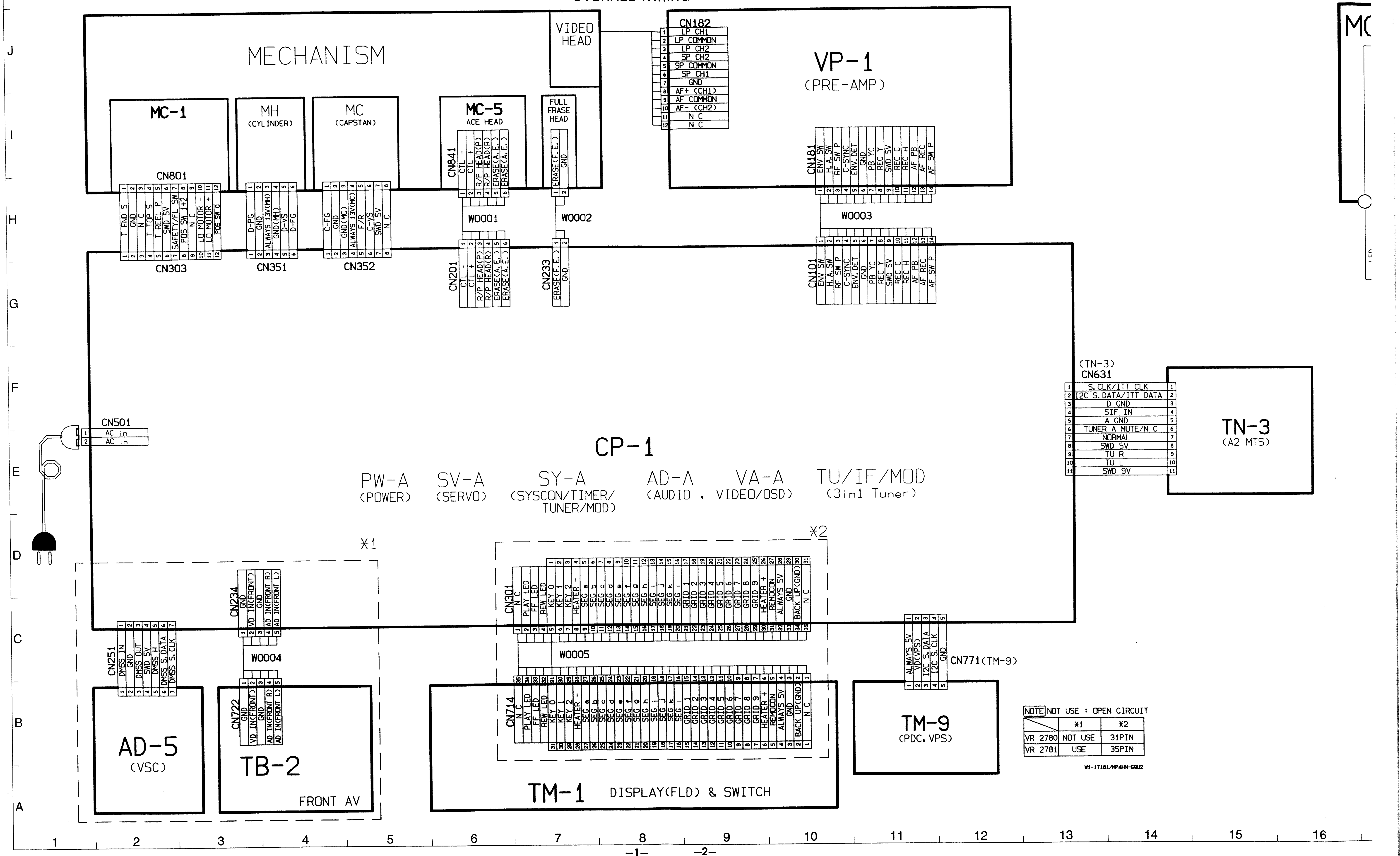
THE COMPONENTS DESIGNATED BY A SYMBOL (⚠) IN THIS SCHEMATIC DIAGRAM DESIGNATES COMPONENTS WHOSE VALUE ARE OF SPECIAL SIGNIFICANCE TO PRODUCT SAFETY.
SHOULD ANY COMPONENT DESIGNATED BY A SYMBOL NEED TO BE REPLACED, USE ONLY THE PART DESIGNATED IN THE PARTS LIST.
DO NOT DEVIATE FROM THE RESISTANCE, WATTAGE AND VOLTAGE RATINGS SHOWN.

EXPLANATORY NOTES (EXAMPLES)

Resistor	10K:16J means 10kilo ohm ±5%, 1/16watt max.
	1M:1/10K means 1mega ohm ±10%, 1/10watt max.
Capacitor	0.047:F means 0.047micro farad, Ftype.
Chemical capacitor	
	10:16 means 10micro farad, 16volt max.
Inductor	330:J means 330micro henry ±5%
	470:K means 470micro henry ±10%

1. OVERALL WIRING,MECHANISM CONNECTION & BLOCK DIAGRAMS

OVERALL WIRING

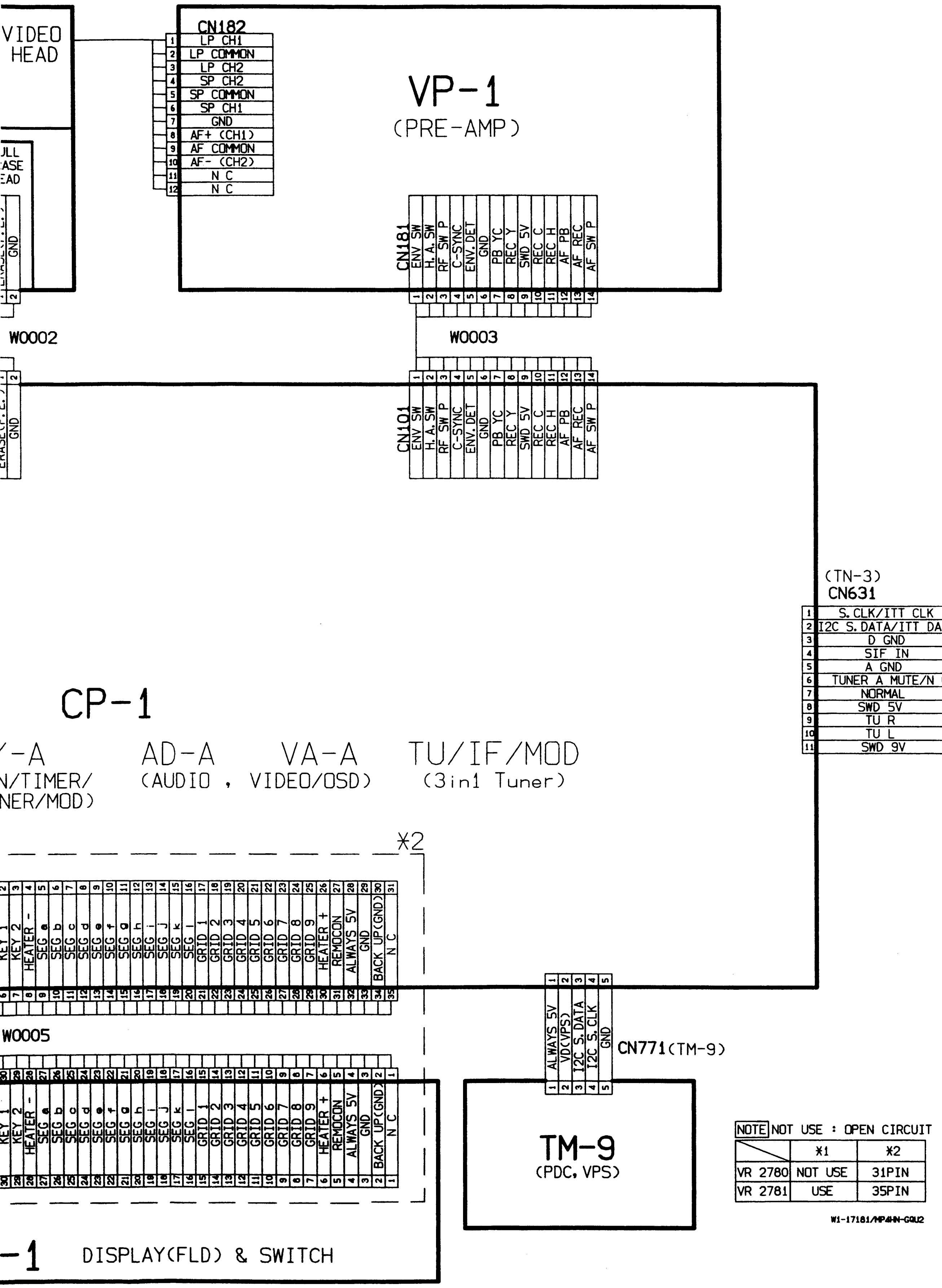

MECHANISM
VIDEO HEAD
MC-1
MH (CYLINDER)
MC (CAPSTAN)
MC-5 ACE HEAD
FULL ERASE HEAD
CN801
T END S, GND, N C, T TOP S, T REEL P, SWD 5V, SAFETY/FL SW, POS SW 1+2, N C, LO MOTOR -, LO MOTOR +, POS SW 0
D-PG, GND, ALWAYS 13V(MH), GND(MH), D-VS, D-FG
C-FG, GND, GND(MC), ALWAYS 13V(MC), F/R, C-VS, SWD 5V, N C
CN841
CTL -, CTL +, R/P HEAD(P), R/P HEAD(R), ERASE(A.E.), ERASE(A.E.)
ERASE(F.E.), GND
W0001
W0002
CN303
CN351
CN352
CN201
CN233
VP-1 (PRE-AMP)
CN182
1 LP CH1
2 LP COMMON
3 LP CH2
4 SP CH2
5 SP COMMON
6 SP CH1
7 GND
8 AF+ (CH1)
9 AF COMMON
10 AF- (CH2)
11 N C
12 N C
CN181
ENV SW, H.A.SW, RF SW P, C-SYNC, ENV. DET, GND, PB YC, REC Y, SWD 5V, REC C, REC H, AF PB, AF REC, AF SW P
W0003
CN101
CN501
1 AC in
2 AC in
CP-1
PW-A (POWER)
SV-A (SERVO)
SY-A (SYSCON/TIMER/TUNER/MOD)
AD-A (AUDIO , VIDEO/OSD)
VA-A
TU/IF/MOD (3in1 Tuner)
(TN-3)
CN631
1 S.CLK/ITT CLK
2 I2C S.DATA/ITT DATA
3 D GND
4 SIF IN
5 A GND
6 TUNER A MUTE/N C
7 NORMAL
8 SWD 5V
9 TU R
10 TU L
11 SWD 9V
TN-3 (A2 MTS)
*1
*2
CN234
GND, VD IN(FRONT), GND, AD IN(FRONT R), AD IN(FRONT L)
W0004
CN722
CN251
DMSS IN, GND, DMSS OUT, SWD 5V, DMSS H, DMSS S.DATA, DMSS S.CLK
AD-5 (VSC)
TB-2
FRONT AV
CN301
N C, PLAY LED, FF LED, REW LED, KEY 0, KEY 1, KEY 2, HEATER -, SEG a, SEG b, SEG c, SEG d, SEG e, SEG f, SEG g, SEG h, SEG i, SEG j, SEG k, SEG l, GRID 1, GRID 2, GRID 3, GRID 4, GRID 5, GRID 6, GRID 7, GRID 8, GRID 9, HEATER +, REMOCON, ALWAYS 5V, GND, BACK UP(GND), N C
W0005
CN714
TM-1 DISPLAY(FLD) & SWITCH
ALWAYS 5V, VD(VPS), I2C S.DATA, I2C S.CLK, GND
CN771(TM-9)
TM-9 (PDC, VPS)
MC
W1-17181/MP4HN-G0U2
K J I H G F E D C B A
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16
-1- -2-

NOTE NOT USE : OPEN CIRCUIT

	*1	*2
VR 2780	NOT USE	31PIN
VR 2781	USE	35PIN

AMS

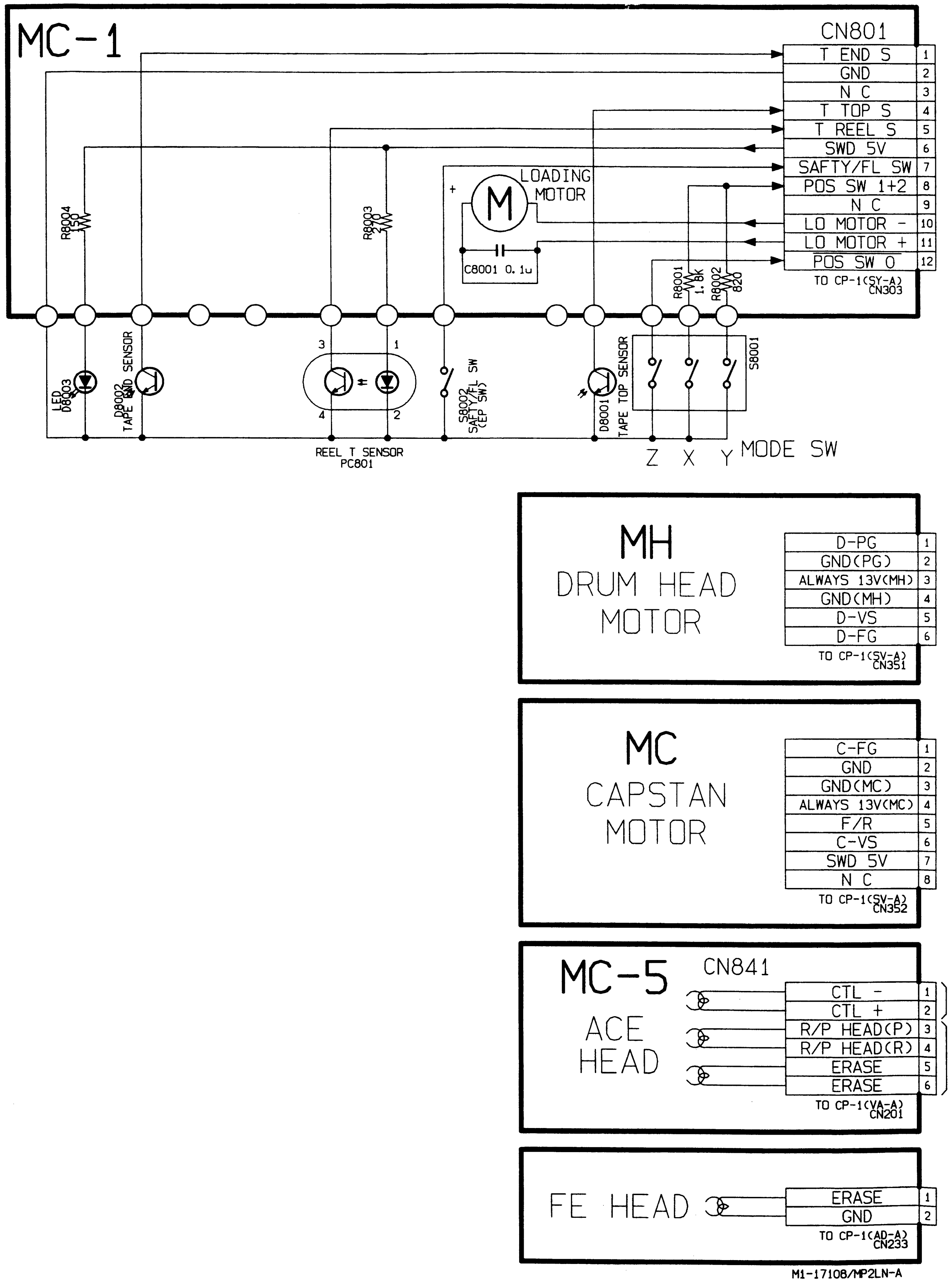
OVERALL WIRING


VIDEO HEAD
ULL
ASE
EAD
GND
W0002
GND
CN182
LP CH1
LP COMMON
LP CH2
SP CH2
SP COMMON
SP CH1
GND
AF+ (CH1)
AF COMMON
AF- (CH2)
N C
N C
VP-1
(PRE-AMP)
CN181
ENV SW
H.A. SW
RF SW P
C-SYNC
ENV.DET
GND
PB YC
REC Y
SWD 5V
REC C
REC H
AF PB
AF REC
AF SW P
W0003
CN101
ENV SW
H.A. SW
RF SW P
C-SYNC
ENV.DET
GND
PB YC
REC Y
SWD 5V
REC C
REC H
AF PB
AF REC
AF SW P
(TN-3)
CN631
S.CLK/ITT CLK
I2C S.DATA/ITT DATA
D GND
SIF IN
A GND
TUNER A MUTE/N C
NORMAL
SWD 5V
TU R
TU L
SWD 9V
TN-3
(A2 MTS)
CP-1
-A
N/TIMER/
NER/MOD)
AD-A
(AUDIO , VIDEO/OSD)
VA-A
TU/IF/MOD
(3in1 Tuner)
*2
KEY 1
KEY 2
HEATER -
SEG a
SEG b
SEG c
SEG d
SEG e
SEG f
SEG g
SEG h
SEG i
SEG j
SEG k
SEG l
GRID 1
GRID 2
GRID 3
GRID 4
GRID 5
GRID 6
GRID 7
GRID 8
GRID 9
HEATER +
REMOCON
ALWAYS 5V
GND
BACK UP(GND)
N C
W0005
ALWAYS 5V
VD(VPS)
I2C S.DATA
I2C S.CLK
GND
CN771(TM-9)
TM-9
(PDC, VPS)
-1
DISPLAY(FLD) & SWITCH
M1-17181/MP4HN-G6U2

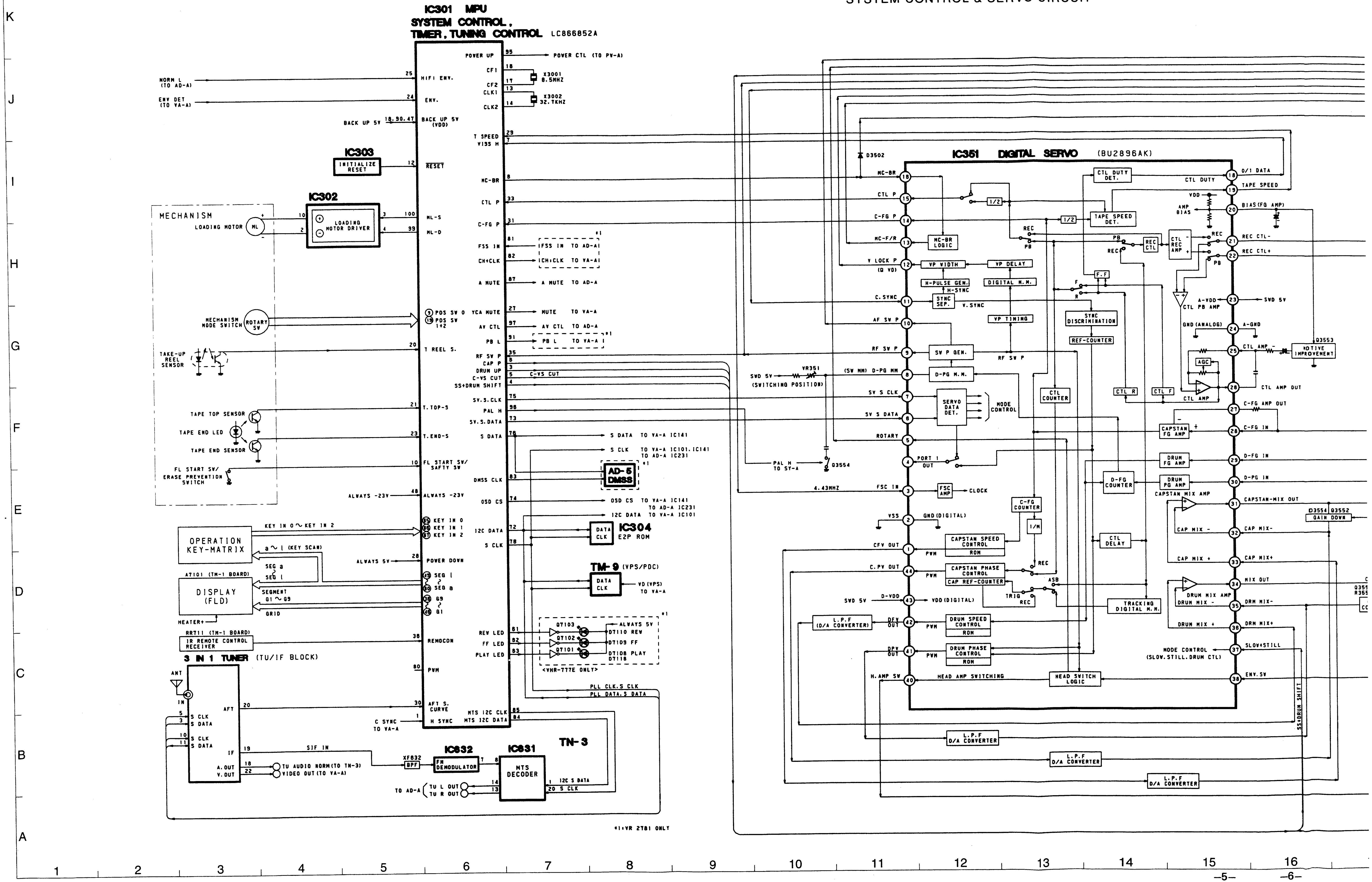
NOTE NOT USE : OPEN CIRCUIT

	*1	*2
VR 2780	NOT USE	31PIN
VR 2781	USE	35PIN

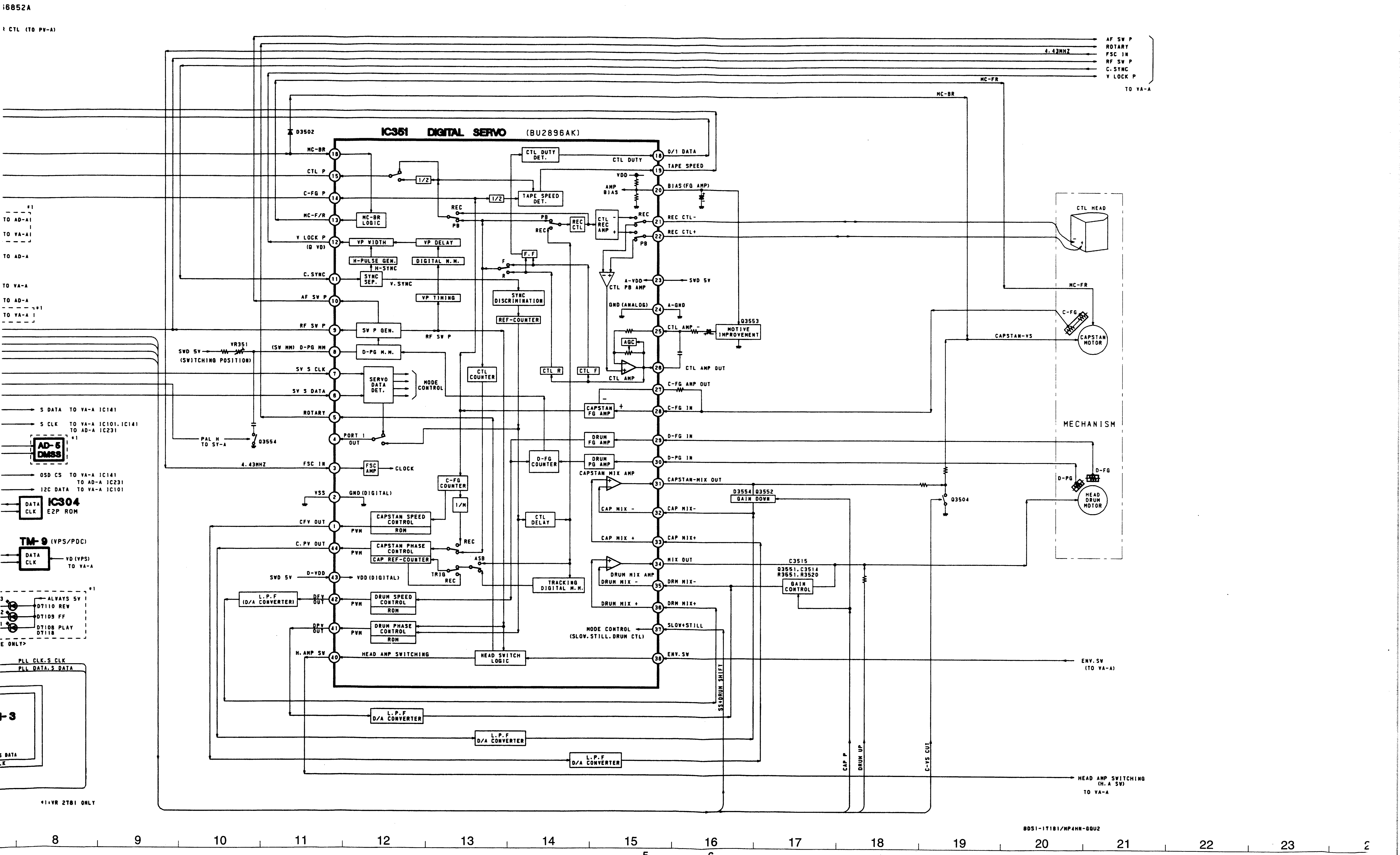
MECHANISM CONNECTION


MC-1
CN801
T END S
GND
N C
T TOP S
T REEL S
SWD 5V
SAFTY/FL SW
POS SW 1+2
N C
LO MOTOR -
LO MOTOR +
POS SW 0
TO CP-1(SY-A) CN303
LOADING MOTOR
M
+
C8001 0.1u
R8004 150
R8003 150
R8001 1.8K
R8002 820
LED D8003
D8002 TAPE END SENSOR
REEL T SENSOR PC801
S8002 SAFTY/FL SW (EP SW)
D8001 TAPE TOP SENSOR
S8001
Z X Y MODE SW
MH
DRUM HEAD MOTOR
D-PG
GND(PG)
ALWAYS 13V(MH)
GND(MH)
D-VS
D-FG
TO CP-1(SV-A) CN351
MC
CAPSTAN MOTOR
C-FG
GND
GND(MC)
ALWAYS 13V(MC)
F/R
C-VS
SWD 5V
N C
TO CP-1(SV-A) CN352
MC-5
CN841
ACE HEAD
CTL -
CTL +
R/P HEAD(P)
R/P HEAD(R)
ERASE
ERASE
TO CP-1(VA-A) CN201
FE HEAD
ERASE
GND
TO CP-1(AD-A) CN233
M1-17108/MP2LN-A

SYSTEM CONTROL & SERVO CIRCUIT


IC301 MPU
SYSTEM CONTROL, TIMER, TUNING CONTROL LC866852A
POWER UP
POWER CTL (TO PV-A)
CF1
CF2
CLK1
CLK2
X3001 8.5MHZ
X3002 32.7KHZ
NORM L (TO AD-A)
ENV DET (TO VA-A)
HIFI ENV.
ENV.
BACK UP 5V
BACK UP 5V (VDD)
T SPEED
VISS H
IC303
INITIALIZE RESET
RESET
IC302
LOADING MOTOR DRIVER
MECHANISM
LOADING MOTOR
ML
ML-S
ML-D
MC-BR
CTL P
C-FG P
FSS IN
CH+CLK
FSS IN TO AD-A
CH+CLK TO VA-A
A MUTE
A MUTE TO AD-A
MECHANISM MODE SWITCH
ROTARY SW
POS SW 0
POS SW 1+2
YCA MUTE
MUTE TO VA-A
AV CTL
AV CTL TO AD-A
PB L
PB L TO VA-A
TAKE-UP REEL SENSOR
T REEL S.
RF SW P
CAP P
DRUM UP
C-VS CUT
SS+DRUM SHIFT
SV.S.CLK
PAL H
SV.S.DATA
TAPE TOP SENSOR
TAPE END LED
TAPE END SENSOR
T.TOP-S
T.END-S
S DATA
S DATA TO VA-A IC141
S CLK TO VA-A IC101, IC141 TO AD-A IC231
FL START SW/ERASE PREVENTION SWITCH
FL START SW/ SAFTY SW
DMSS CLK
AD-5 DMSS
ALWAYS -23V
OSD CS
OSD CS TO VA-A IC141 TO AD-A IC231
I2C DATA TO VA-A IC101
OPERATION KEY-MATRIX
KEY IN 0 ~ KEY IN 2
KEY IN 0
KEY IN 1
KEY IN 2
a ~ l (KEY SCAN)
I2C DATA
S CLK
IC304
E2P ROM
DATA
CLK
ALWAYS 5V
POWER DOWN
SEG a ~ SEG l
SEG l ~ SEG a
AT101 (TM-1 BOARD)
DISPLAY (FLD)
SEGMENT
G1 ~ G9
GRID
HEATER+
TM-9 (VPS/PDC)
VD (VPS) TO VA-A
RRT11 (TM-1 BOARD)
IR REMOTE CONTROL RECEIVER
REMOCON
REW LED
FF LED
PLAY LED
Q7103
Q7102
Q7101
D7110 REW
D7109 FF
D7108 PLAY
D7118
<VHR-777E ONLY>
PWM
3 IN 1 TUNER (TU/IF BLOCK)
ANT
IN
S CLK
S DATA
AFT
IF
A.OUT
V.OUT
AFT S. CURVE
H SYNC
C SYNC TO VA-A
MTS I2C CLK
MTS I2C DATA
PLL CLK.S CLK
PLL DATA.S DATA
SIF IN
TU AUDIO NORM (TO TN-3)
VIDEO OUT (TO VA-A)
XF832 BPF
IC832 FM DEMODULATOR
IC831 MTS DECODER
TN-3
I2C S DATA
S CLK
TO AD-A
TU L OUT
TU R OUT
*1: VR 2781 ONLY
IC351 DIGITAL SERVO (BU2896AK)
D3502
MC-BR
CTL P
C-FG P
MC-F/R
V LOCK P (Q VD)
C.SYNC
AF SW P
RF SW P
(SW MM) D-PG MM
SW5 5V
VR351
(SWITCHING POSITION)
SV S CLK
SV S DATA
ROTARY
PORT 1 OUT
PAL H TO SY-A
Q3554
4.43MHZ
FSC IN
VSS
GND (DIGITAL)
CFV OUT
C.PV OUT
D-VDD
VDD (DIGITAL)
DFV OUT
DPV OUT
H.AMP SW
HEAD AMP SWITCHING
MC-BR LOGIC
1/2
VP WIDTH
VP DELAY
H-PULSE GEN.
H-SYNC
DIGITAL M.M.
SYNC SEP.
V.SYNC
VP TIMING
SV P GEN.
D-PG M.M.
SERVO DATA DET.
MODE CONTROL
FSC AMP
CLOCK
CAPSTAN SPEED CONTROL
ROM
CAPSTAN PHASE CONTROL
CAP REF-COUNTER
TRIG
REC
ASB
L.P.F (D/A CONVERTER)
DRUM SPEED CONTROL
DRUM PHASE CONTROL
HEAD SWITCH LOGIC
CTL DUTY DET.
CTL DUTY
TAPE SPEED DET.
REC
PB
F.F
SYNC DISCRIMINATION
REF-COUNTER
CTL COUNTER
C-FG COUNTER
1/M
D-FG COUNTER
CTL DELAY
TRACKING DIGITAL M.M.
CTL R
CTL F
REC CTL
CTL REC AMP
VDD
AMP BIAS
CTL PB AMP
GND (ANALOG)
AGC
CTL AMP
CAPSTAN FG AMP
DRUM FG AMP
DRUM PG AMP
CAPSTAN MIX AMP
CAP MIX -
CAP MIX +
DRUM MIX AMP
DRUM MIX -
DRUM MIX +
MODE CONTROL (SLOW, STILL, DRUM CTL)
D/1 DATA
TAPE SPEED
BIAS (FG AMP)
REC CTL-
REC CTL+
A-VDD
SWD 5V
A-GND
CTL AMP
Q3553
NOTIVE IMPROVEMENT
CTL AMP OUT
C-FG AMP OUT
C-FG IN
D-FG IN
D-PG IN
CAPSTAN-MIX OUT
Q3554 Q3552
GAIN DOWN
CAP MIX-
CAP MIX+
MIX OUT
DRM MIX-
DRM MIX+
SLOW+STILL
ENV.SW
SS+DRUM SHIFT
L.P.F D/A CONVERTER
K
J
I
H
G
F
E
D
C
B
A
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16

SYSTEM CONTROL & SERVO CIRCUIT



6852A
CTL (TO PV-A)
IC351 DIGITAL SERVO (BU2896AK)
D3502
MC-BR
CTL P
C-FG P
MC-F/R
V LOCK P (Q VD)
C.SYNC
AF SW P
RF SW P
(SW HH) D-PG HH
SV S CLK
SV S DATA
ROTARY
PORT 1 OUT
FSC IN
VSS
GND (DIGITAL)
CFV OUT
C.PV OUT
D-VDD
VDD (DIGITAL)
DFV OUT
DPV OUT
H.AMP SW
HEAD AMP SWITCHING
MC-BR LOGIC
1/2
TAPE SPEED DET.
CTL DUTY DET.
CTL DUTY
VP WIDTH
VP DELAY
H-PULSE GEN.
H-SYNC
DIGITAL M.M.
SYNC SEP.
V.SYNC
VP TIMING
SYNC DISCRIMINATION
REF-COUNTER
SW P GEN.
D-PG M.M.
SERVO DATA DET.
MODE CONTROL
CTL COUNTER
CTL R
CTL F
F.F
REC CTL
CTL REC AMP
CTL PB AMP
AGC
CTL AMP
C-FG COUNTER
1/N
CAPSTAN SPEED CONTROL
ROM
PWM
CAPSTAN PHASE CONTROL
CAP REF-COUNTER
TRIG
ASB
REC
PB
D-FG COUNTER
CTL DELAY
TRACKING DIGITAL M.M.
DRUM SPEED CONTROL
DRUM PHASE CONTROL
HEAD SWITCH LOGIC
FSC AMP
CLOCK
L.P.F (D/A CONVERTER)
L.P.F D/A CONVERTER
SWD 5V
VR351
(SWITCHING POSITION)
PAL H TO SY-A
Q3554
4.43MHZ
0/1 DATA
TAPE SPEED
VDD
AMP BIAS
BIAS(FG AMP)
REC CTL-
REC CTL+
A-VDD
SWD 5V
GND (ANALOG)
A-GND
CTL AMP -
Q3553
MOTIVE IMPROVEMENT
CTL AMP OUT
C-FG AMP OUT
CAPSTAN FG AMP
C-FG IN
DRUM FG AMP
D-FG IN
DRUM PG AMP
D-PG IN
CAPSTAN MIX AMP
CAPSTAN-MIX OUT
CAP MIX -
CAP MIX-
CAP MIX +
CAP MIX+
D3554 Q3552
GAIN DOWN
MIX OUT
DRUM MIX AMP
DRUM MIX -
DRM MIX-
DRUM MIX +
DRM MIX+
C3515
Q3551, C3514
R3651, R3520
GAIN CONTROL
MODE CONTROL (SLOW, STILL, DRUM CTL)
SLOW+STILL
ENV.SW
ENV.SW (TO VA-A)
SS+DRUM SHIFT
CAP P
DRUM UP
C-VS CUT
HEAD AMP SWITCHING (H.A SW) TO VA-A
AF SW P
ROTARY
FSC IN
RF SW P
C.SYNC
V LOCK P
TO VA-A
4.43MHZ
MC-FR
MC-BR
CTL HEAD
MC-FR
C-FG
CAPSTAN-VS
CAPSTAN MOTOR
MECHANISM
D-PG
D-FG
HEAD DRUM MOTOR
Q3504
TO AD-A
TO VA-A
TO AD-A
TO VA-A
TO AD-A
TO VA-A
S DATA TO VA-A IC141
S CLK TO VA-A IC101, IC141 TO AD-A IC231
AD-5 DMSS
OSD CS TO VA-A IC141 TO AD-A IC231
I2C DATA TO VA-A IC101
DATA CLK
IC304 E2P ROM
TM-9 (VPS/PDC)
DATA CLK
VD (VPS) TO VA-A
ALWAYS 5V
D7110 REW
D7109 FF
D7108 PLAY D7118
E ONLY>
PLL CLK, S CLK
PLL DATA, S DATA
-3
S DATA
*1:VR 2781 ONLY
*1
BDS1-1T181/MP4HN-GGU2
8
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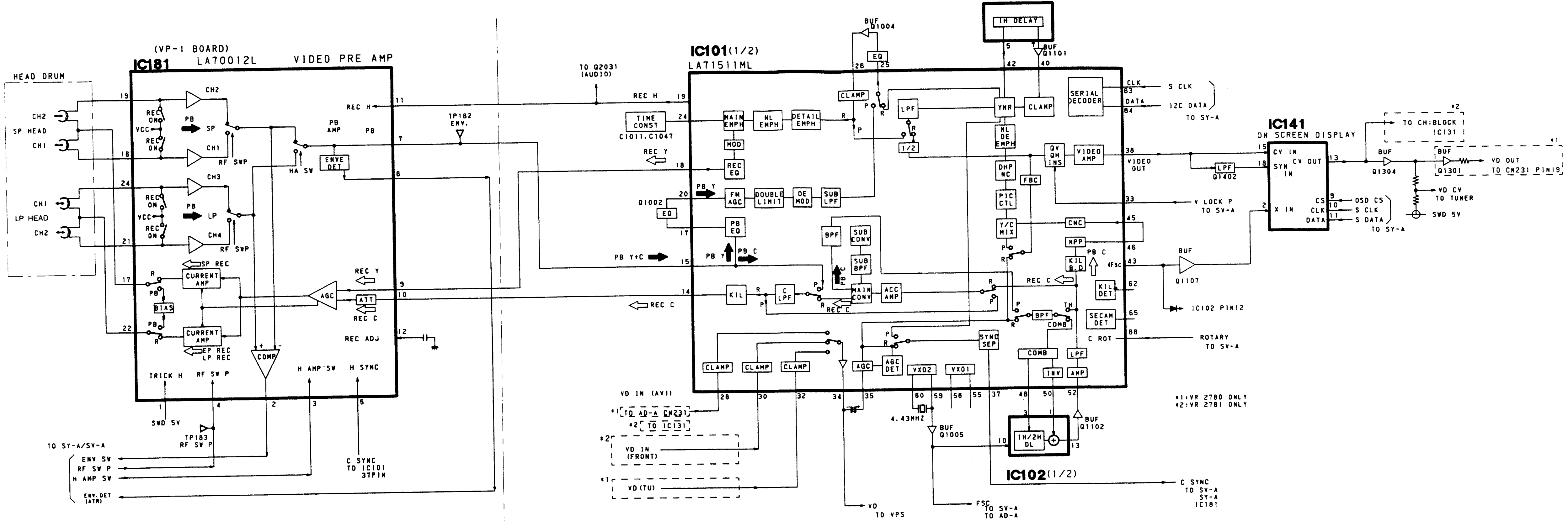
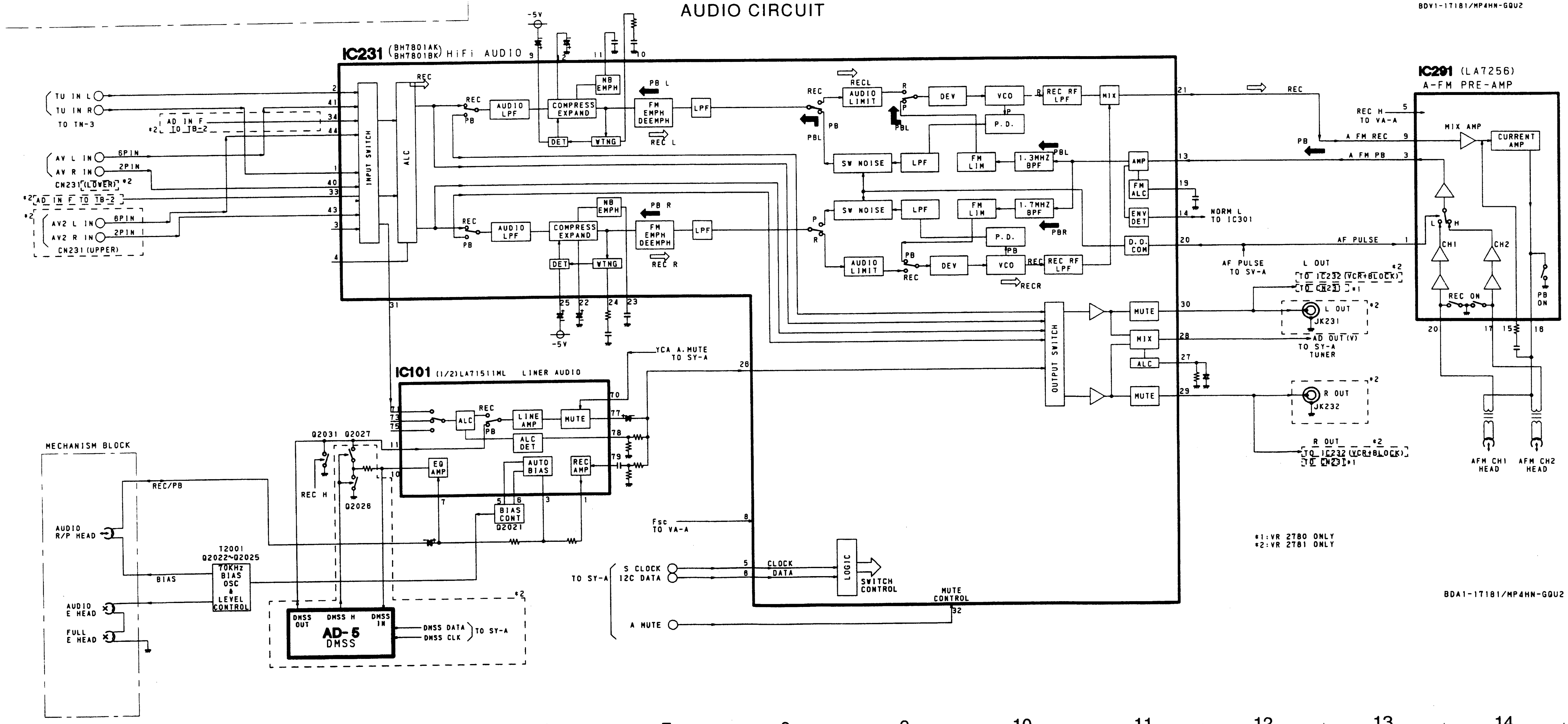
22
23

VIDEO CIRCUIT

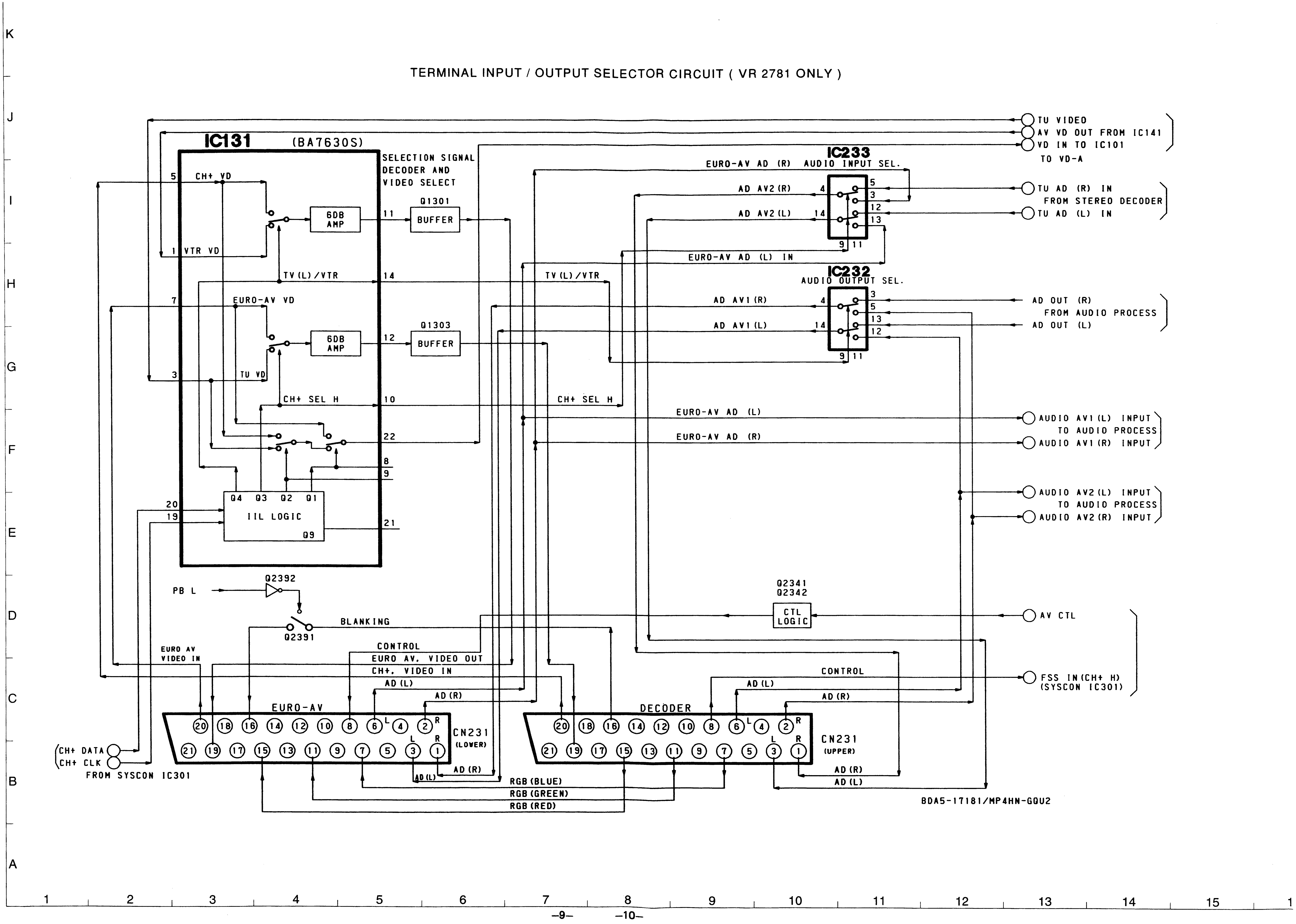

IC102(1/2)
1H DELAY
(VP-1 BOARD)
IC181 LA70012L VIDEO PRE AMP
HEAD DRUM
SP HEAD
LP HEAD
CH1
CH2
REC ON
VCC
PB
SP
LP
RF SW P
HA SW
PB AMP
ENVE DET
CURRENT AMP
BIAS
AGC
ATT
COMP
REC H
REC Y
REC C
REC ADJ
TRICK H
H AMP SW
H SYNC
SWD 5V
TP183 RF SW P
TP182 ENV.
TO SY-A/SV-A
ENV SW
RF SW P
H AMP SW
ENV.DET (ATR)
C SYNC TO IC101 3PIN
TO Q2031 (AUDIO)
IC101(1/2) LA71511ML
TIME CONST C1011,C1047
MAIN EMPH
NL EMPH
DETAIL EMPH
MOD
REC EQ
FM AGC
DOUBLE LIMIT
DE MOD
SUB LPF
PB EQ
PB Y+C
Q1002 EQ
BUF Q1004
BUF Q1101
CLAMP
LPF
YNR
NL DE EMPH
DHP NC
FBC
PIC CTL
Y/C MIX
DV QH INS
VIDEO AMP
SERIAL DECODER
S CLK
I2C DATA TO SY-A
VIDEO OUT
V LOCK P TO SY-A
KIL
C LPF
BPF
SUB CONV
SUB BPF
MAIN CONV
ACC AMP
CNC
NPP
KIL B.D
KIL DET
SECAM DET
COMB
INV
AMP
SYNC SEP
AGC DET
VXO2
VXO1
4.43MHZ
BUF Q1005
BUF Q1102
1H/2H DL
IC102(1/2)
4Fsc
BUF Q1107
IC102 PIN12
ROTARY TO SY-A
C ROT
VD IN (AV1)
*1 TO AD-A CN231
*2 TO IC131
VD IN (FRONT)
VD (TU)
VD TO VPS
FSC TO SY-A TO AD-A
C SYNC TO SV-A SY-A IC181
IC141 ON SCREEN DISPLAY
CV IN
SYN IN
CV OUT
X IN
CS
CLK
DATA
LPF Q1402
BUF Q1304
BUF Q1301
VD OUT TO CN231 PIN19
VD CV TO TUNER
SWD 5V
TO CH:BLOCK IC131
OSD CS
S CLK
S DATA TO SY-A
*1:VR 2780 ONLY
*2:VR 2781 ONLY
BDV1-17181/MP4HN-GQU2

AUDIO CIRCUIT


IC231 (BH7801AK) (BH7801BK) HiFi AUDIO
-5V
TU IN L
TU IN R
TO TN-3
AD IN F
*2 TO TB-2
AV L IN 6PIN
AV R IN 2PIN
CN231(LOWER)
*2 AD IN F TO TB-2
AV2 L IN 8PIN
AV2 R IN 2PIN
CN231(UPPER)
INPUT SWITCH
ALC
REC
PB
AUDIO LPF
COMPRESS EXPAND
DET
WTNG
NB EMPH
FM EMPH DEEMPH
PB L
PB R
REC L
REC R
AUDIO LIMIT
RECL
DEV
VCO
REC RF LPF
P.D.
PBL
PBR
RECR
SW NOISE
FM LIM
1.3MHZ BPF
1.7MHZ BPF
MIX
AMP
FM ALC
ENV DET
D.O. COM
NORM L TO IC301
AF PULSE
AF PULSE TO SY-A
L OUT *2 TO IC232 (VCR+BLOCK) TO CN231 *1
OUTPUT SWITCH
MUTE
L OUT *2 JK231
AD OUT(V) TO SY-A TUNER
R OUT JK232
R OUT *2 TO IC232 (VCR+BLOCK) TO CN231 *1
YCA A.MUTE TO SY-A
IC101 (1/2)LA71511ML LINER AUDIO
ALC
LINE AMP
ALC DET
EQ AMP
AUTO BIAS
REC AMP
BIAS CONT Q2021
Q2031 Q2027
Q2026
REC H
MECHANISM BLOCK
REC/PB
AUDIO R/P HEAD
BIAS
T2001 Q2022~Q2025
70KHz BIAS OSC & LEVEL CONTROL
AUDIO E HEAD
FULL E HEAD
DMSS OUT
DMSS H
DMSS IN
AD-5 DMSS
DMSS DATA
DMSS CLK
TO SY-A
Fsc TO VA-A
TO SY-A
S CLOCK
I2C DATA
CLOCK
DATA
LOGIC
SWITCH CONTROL
MUTE CONTROL
A MUTE
IC291 (LA7256) A-FM PRE-AMP
REC H TO VA-A
A FM REC
A FM PB
MIX AMP
CURRENT AMP
CH1
CH2
REC ON
PB ON
AFM CH1 HEAD
AFM CH2 HEAD
*1:VR 2780 ONLY
*2:VR 2781 ONLY
BDA1-17181/MP4HN-GQU2

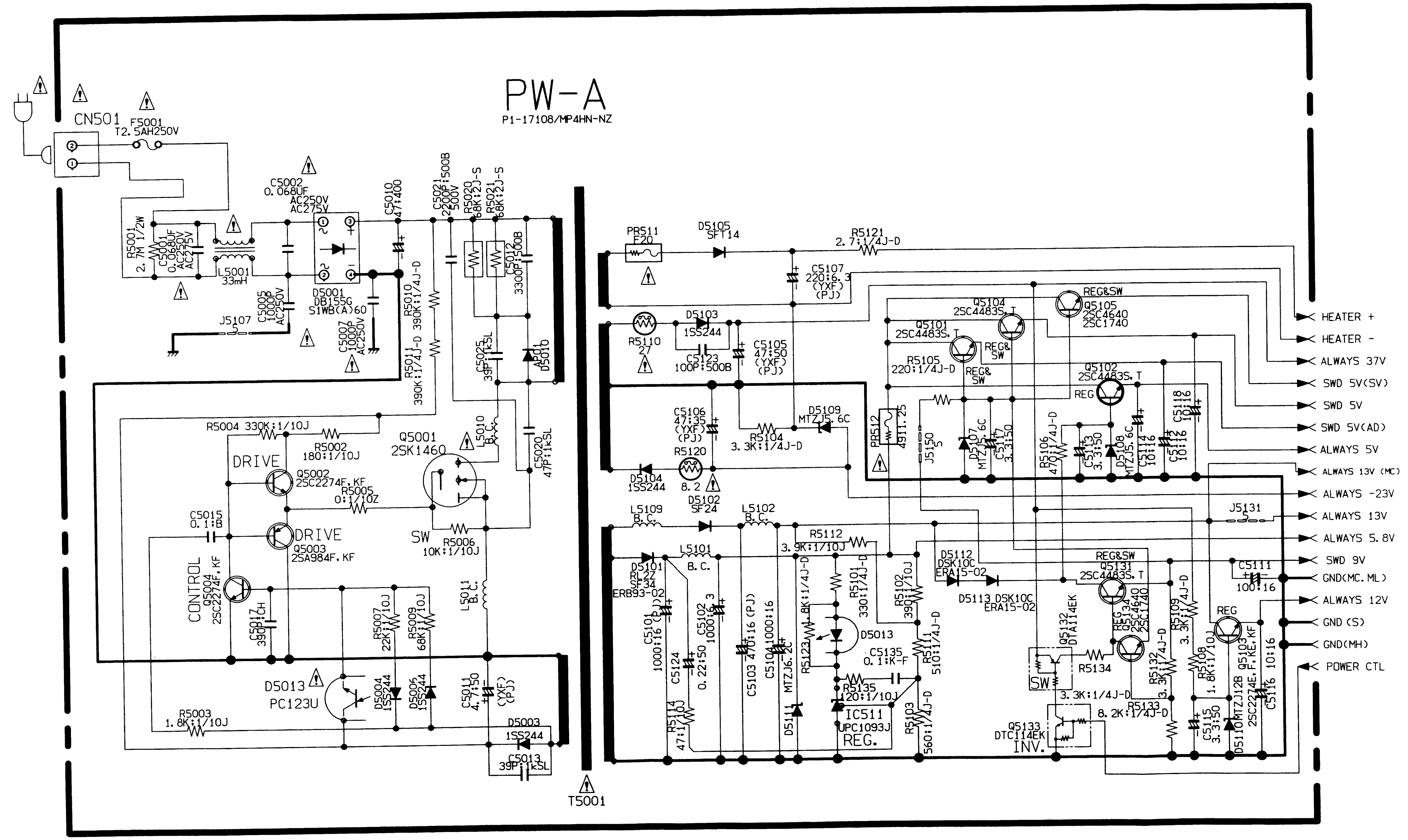
K
J
I
H
G
F
E
D
C
B
A
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15

TERMINAL INPUT / OUTPUT SELECTOR CIRCUIT (VR 2781 ONLY)


IC131 (BA7630S)
SELECTION SIGNAL DECODER AND VIDEO SELECT
CH+ VD
VTR VD
6DB AMP
Q1301
BUFFER
TV (L) / VTR
EURO-AV VD
Q1303
TU VD
CH+ SEL H
Q4 Q3 Q2 Q1
IIL LOGIC
Q9
IC233 AUDIO INPUT SEL.
EURO-AV AD (R)
AD AV2 (R)
AD AV2 (L)
EURO-AV AD (L) IN
IC232 AUDIO OUTPUT SEL.
AD AV1 (R)
AD AV1 (L)
EURO-AV AD (L)
EURO-AV AD (R)
TU VIDEO
AV VD OUT FROM IC141
VD IN TO IC101
TO VD-A
TU AD (R) IN
FROM STEREO DECODER
TU AD (L) IN
AD OUT (R)
FROM AUDIO PROCESS
AD OUT (L)
AUDIO AV1 (L) INPUT
TO AUDIO PROCESS
AUDIO AV1 (R) INPUT
AUDIO AV2 (L) INPUT
TO AUDIO PROCESS
AUDIO AV2 (R) INPUT
PB L
Q2392
Q2391
BLANKING
Q2341
Q2342
CTL LOGIC
AV CTL
FSS IN (CH+ H) (SYSCON IC301)
EURO AV VIDEO IN
CONTROL
EURO AV. VIDEO OUT
CH+. VIDEO IN
AD (L)
AD (R)
EURO-AV
CN231 (LOWER)
DECODER
CN231 (UPPER)
CH+ DATA
CH+ CLK
FROM SYSCON IC301
RGB (BLUE)
RGB (GREEN)
RGB (RED)
BDA5-17181/MP4HN-GQU2
K J I H G F E D C B A
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 1

2. CIRCUIT DIAGRAMS & PRINTED WIRING BOARDS (P.W.B.)

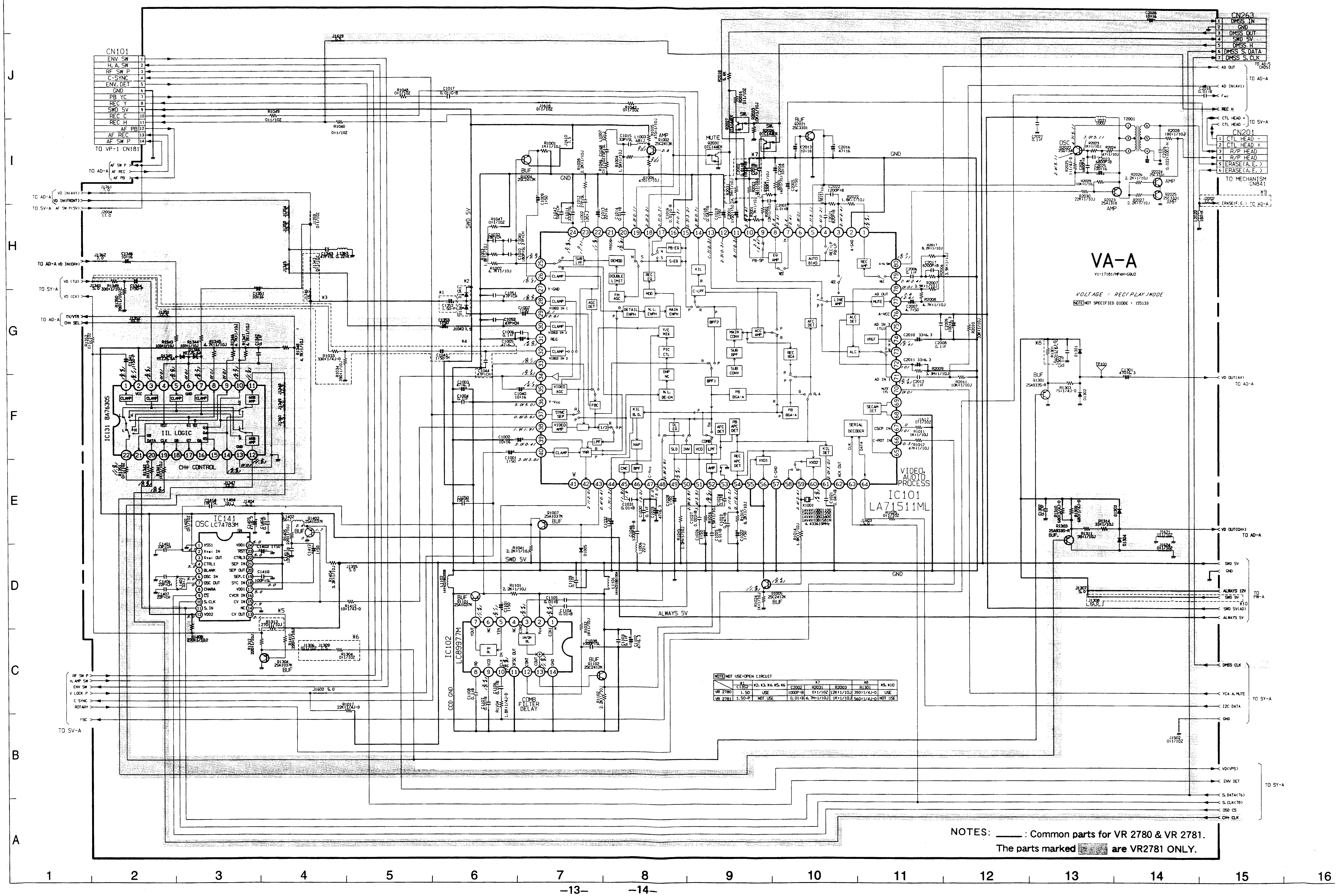
CP-1 BOARD (PW-A) POWER SUPPLY


PW-A
P1-17108/MP4HN-NZ
CN501
F5001
T2. 5AH250V
R5001
2. 7M 1/2W
C5001
0.068UF
AC250V
AC275V
L5001
33mH
C5002
0. 068UF
AC250V
AC275V
C5005
1000P
AC250V
D5001
DB155G
S1WB(A)60
J5107
C5007
1000P
AC250V
C5010
47:400
C5021
2200P:500B
500V
R5020
68K:1/2J-S
R5021
68K:1/2J-S
C5012
3300P:500B
R5010
390K:1/4J-D
R5011
390K:1/4J-D
C5025
39P:1KSL
D5010
C5020
47P:1KSL
L5010
B.C.
Q5001
2SK1460
SW
R5006
10K:1/10J
R5004 330K:1/10J
R5002
180:1/10J
DRIVE
Q5002
2SC2274F.KF
R5005
0:1/10Z
C5015
0.1:B
DRIVE
Q5003
2SA984F.KF
CONTROL
Q5004
2SC2274F.KF
C5017
390P:CH
R5007
22K:1/10J
R5009
68K:1/10J
L5011
B.C.
D5013
PC123U
D5004
1SS244
D5005
1SS244
C5011
4.7:50
(YXF)
(PJ)
R5003
1.8K:1/10J
D5003
1SS244
C5013
39P:1KSL
T5001
PR511
F20
D5105
SFT14
R5121
2.7:1/4J-D
C5107
220:6.3
(YXF)
(PJ)
R5110
27
D5103
1SS244
C5123
100P:500B
C5105
47:50
(YXF)
(PJ)
C5106
47:35
(YXF)
(PJ)
R5120
8.2
R5104
3.3K:1/4J-D
D5109
MTZJ5.6C
D5104
1SS244
D5102
SF24
L5109
B.C.
L5102
B.C.
R5112
3.9K:1/10J
L5101
B.C.
D5101
RL2Z
SF34
ERB93-02
C5101
1000:16
C5124
0.22:50
C5102
1000:6.3
C5103 470:16 (PJ)
C5104 1000:16
D5111
MTZJ6.2C
R5123
1.8K:1/4J-D
R5101
330:1/4J-D
D5013
C5135
0.1:K-F
R5135
120:1/10J
IC511
UPC1093J
REG.
R5114
47:1/4J
R5102
390:1/10J
R5111
510:1/4J-D
R5103
560:1/4J-D
Q5104
2SC4483S.T
Q5101
2SC4483S.T
REG&
SW
R5105
220:1/4J-D
REG&
SW
REG&SW
Q5105
2SC4640
2SC1740
Q5102
2SC4483S.T
REG
PR512
4911.25
J5150
D5107
MTZJ5.6C
C5117
3.3:50
R5106
470:1/4J-D
C5113
3.3:50
D5108
MTZJ5.6C
C5114
10:16
C5112
10:16
C5118
10:16
D5112
DSK10C
ERA15-02
D5113 DSK10C
ERA15-02
REG&SW
Q5131
2SC4483S.T
Q5132
DTA114EK
SW
R5134
Q5134
2SC4640
2SC1740
REG
R5132
3.3K:1/4J-D
R5133
8.2K:1/4J-D
Q5133
DTC114EK
INV.
R5109
3.3K:1/4J-D
R5108
1.8K:1/10J
C5115
3.3:50
D5110 MTZJ12B
Q5103
2SC2274E.F.KE.KF
C5116 10:16
J5131
C5111
100:16
HEATER +
HEATER -
ALWAYS 37V
SWD 5V(SV)
SWD 5V
SWD 5V(AD)
ALWAYS 5V
ALWAYS 13V (MC)
ALWAYS -23V
ALWAYS 13V
ALWAYS 5.8V
SWD 9V
GND(MC.ML)
ALWAYS 12V
GND (S)
GND(MH)
POWER CTL

K
J
I
H
G
F
E
D
C
B
A

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15

CP-1 BOARD (VA-A) VIDEO & AUDIO


K
J
I
H
G
F
E
D
C
B
A
1
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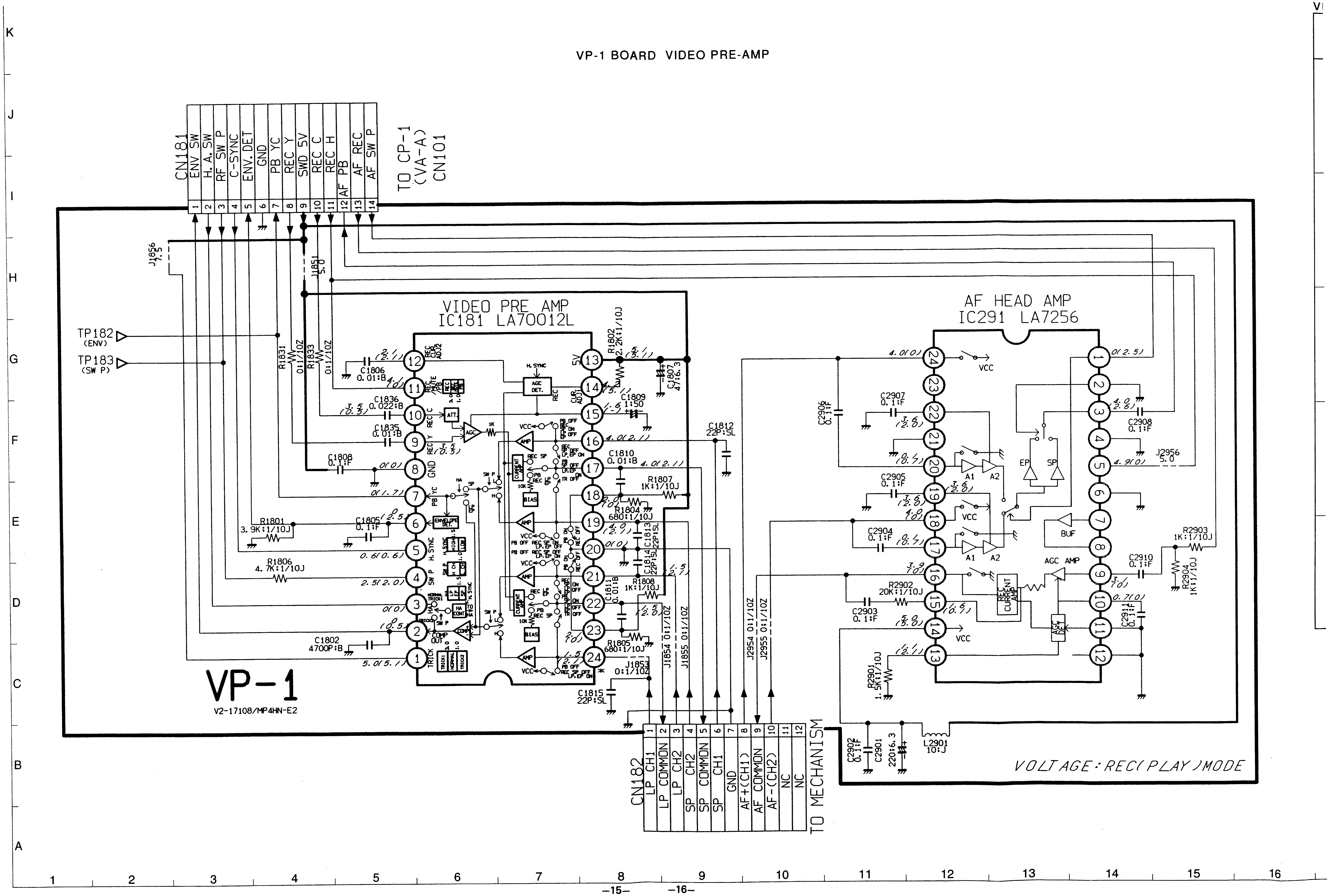
14
15
16
CN101
ENV SW 1
H. A. SW 2
RF SW P 3
C-SYNC 4
ENV. DET 5
GND 6
PB YC 7
REC Y 8
SWD 5V 9
REC C 10
REC H 11
AF PB 12
AF REC 13
AF SW P 14
TO VP-1 CN181
TO AD-A
AF SW P
AF REC
AF PB
VD IN(AV1)
VD IN(FRONT)
TO SY-A
TO AD-A VD IN(CH+)
VD (TU)
VD (CV)
TV/VTR
CH+ SEL
IC131 BA7630S
IIL LOGIC
CH+ CONTROL
CLAMP
IC141
OSC LC74783M
BUF
IC102
LC89977M
COMB FILTER DELAY
CCD GND
SWD 5V
ALWAYS 5V
GND
IC101
LA71511ML
VIDEO, AUDIO PROCESS
MUTE
AMP
OSC
T2001
CN263
1 DMSS IN
2 GND
3 DMSS OUT
4 SWD 5V
5 DMSS H
6 DMSS S. DATA
7 DMSS S. CLK
TO AD-S CN251
AD OUT
AD IN(AV1)
Fsc
REC H
TO AD-A
CTL HEAD +
CTL HEAD -
TO SV-A
CN201
1 CTL HEAD -
2 CTL HEAD +
3 R/P HEAD
4 R/P HEAD
5 ERASE(A. E.)
6 ERASE(A. E.)
TO MECHANISM CN841
ERASE(F. E.) TO AD-A
VA-A
V1-17181/MP4H-GQU2
VOLTAGE : REC(PLAY)MODE
NOTE NOT SPECIFIED DIODE : 1SS133
VD OUT(AV)
TO AD-A
VD OUT(CH+)
TO AD-A
SWD 5V
GND
ALWAYS 12V
SWD 5V
SWD 5V(AD)
ALWAYS 5V
TO PW-A
DMSS CLK
YCA A. MUTE
I2C DATA
GND
TO SY-A
VD(VPS)
ENV DET
S. DATA(7b)
S. CLK(7B)
OSD CS
CH+ CLK
TO SY-A
RF SW P
H. AMP SW
ENV SW
V LOCK P
C SYNC
ROTARY
FSC
TO SV-A

NOTE NOT USE:OPEN CIRCUIT

	※1	※2. ※3. ※4. ※5. ※6	※7			※8	※9. ※10
	C1352		C2002	R2031	R2003	R1301	
VR 2780	1.50	USE	1000P:B	0:1/10Z	12K:1/10J	390:1/4J-D	USE
VR 2781	1.50-P	NOT USE	0.01:B	4.7M:1/10J	1K:1/10J	560:1/4J-D	NOT USE

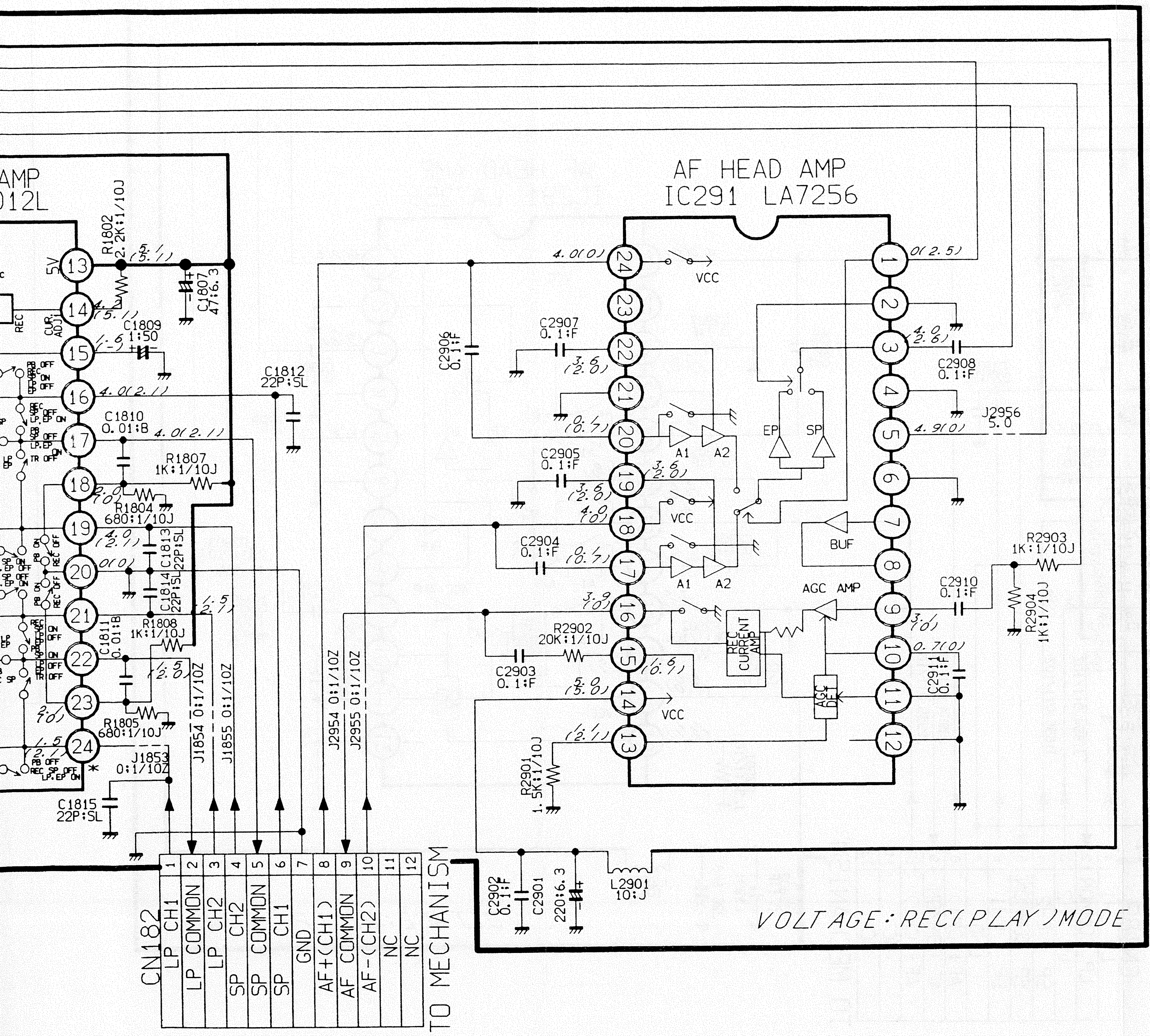
NOTES: ____ : Common parts for VR 2780 & VR 2781.
The parts marked ▨ **are** VR2781 ONLY.

VP-1 BOARD VIDEO PRE-AMP

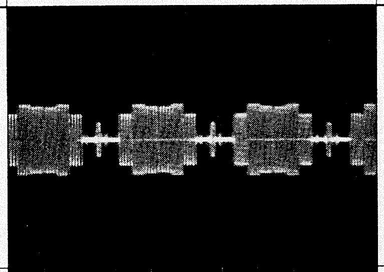
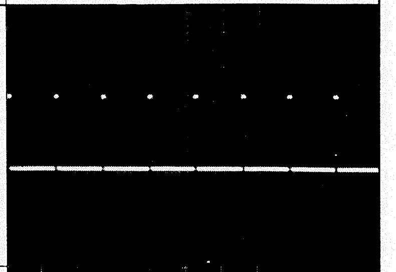
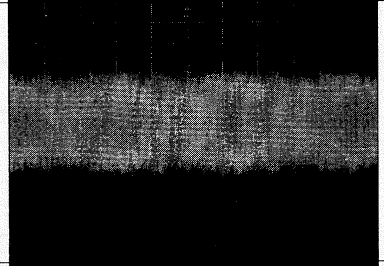
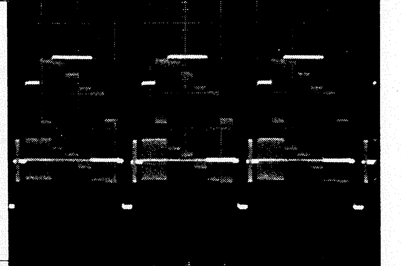
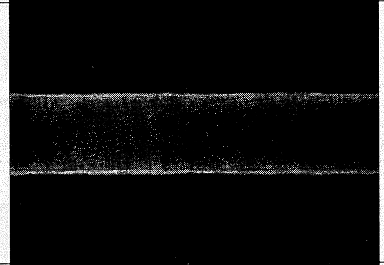
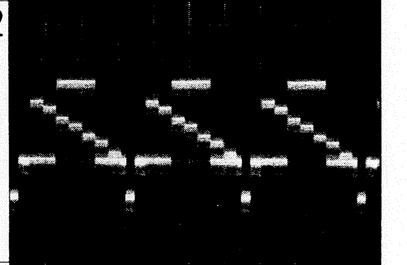
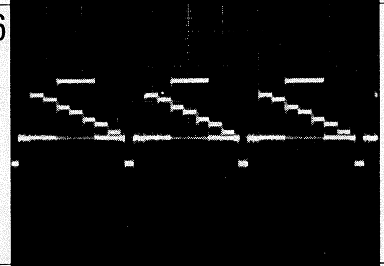
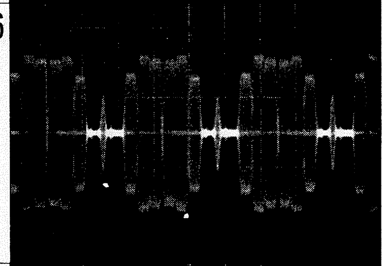
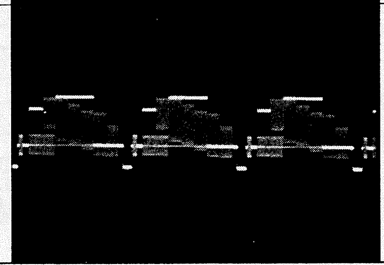
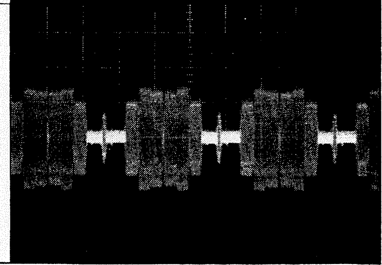


CN181
1 ENV SW
2 H. A. SW
3 RF SW P
4 C-SYNC
5 ENV. DET
6 GND
7 PB YC
8 REC Y
9 SWD 5V
10 REC C
11 REC H
12 AF PB
13 AF REC
14 AF SW P
TO CP-1 (VA-A) CN101
J1856 7.5
J1851 5.0
TP182 (ENV)
TP183 (SW P)
VIDEO PRE AMP
IC181 LA70012L
R1831 0:1/10Z
R1833 0:1/10Z
C1806 0.01:B
C1836 0.022:B
C1835 0.01:B
C1808 0.1:F
R1801 3.9K:1/10J
C1805 0.1:F
R1806 4.7K:1/10J
C1802 4700P:B
R1802 2.2K:1/10J
C1807 47:6.3
C1809 1:50
C1812 22P:SL
C1810 0.01:B
R1807 1K:1/10J
R1804 680:1/10J
C1813 22P:SL
C1814 22P:SL
C1811 0.01:B
R1808 1K:1/10J
R1805 680:1/10J
J1853 0:1/10Z
C1815 22P:SL
J1854 0:1/10Z
J1855 0:1/10Z
J2954 0:1/10Z
J2955 0:1/10Z
AGC DET.
ATT.
AGC
AMP
BIAS
CURRENT AMP
ENVELOPE DET.
COMP
VCC
REC SP
PB OFF
TRICK
GND
5V
VP-1
V2-17108/MP4HN-E2
AF HEAD AMP
IC291 LA7256
C2906 0.1:F
C2907 0.1:F
C2905 0.1:F
C2904 0.1:F
R2902 20K:1/10J
C2903 0.1:F
R2901 1.5K:1/10J
C2908 0.1:F
J2956 5.0
R2903 1K:1/10J
R2904 1K:1/10J
C2910 0.1:F
C2911 0.1:F
A1
A2
EP
SP
BUF
AGC AMP
REC CURRENT AMP
AGC DET
VCC
C2902 0.1:F
C2901 220:6.3
L2901 10:J
CN182
1 LP CH1
2 LP COMMON
3 LP CH2
4 SP CH2
5 SP COMMON
6 SP CH1
7 GND
8 AF+(CH1)
9 AF COMMON
10 AF-(CH2)
11 NC
12 NC
TO MECHANISM
VOLTAGE: REC(PLAY)MODE

VP-1 BOARD VIDEO PRE-AMP

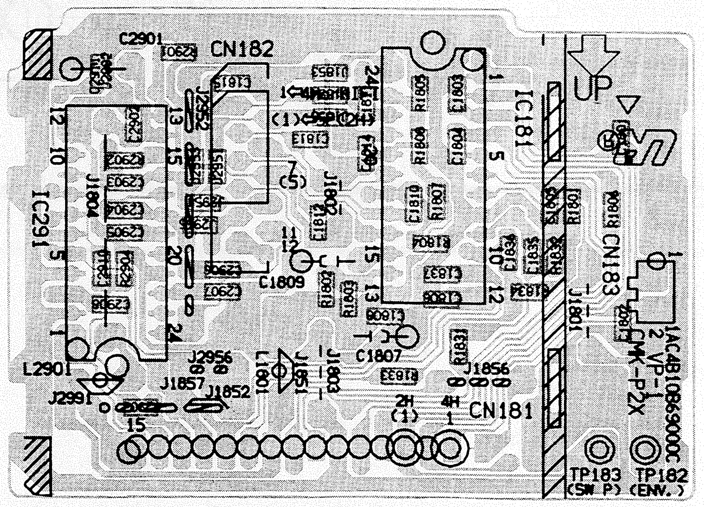

AMP
012L
AF HEAD AMP
IC291 LA7256
VCC
EP
SP
A1
A2
BUF
AGC AMP
REC CURRENT AMP
AGC DET
C2907 0.1:F
C2906 0.1:F
C2905 0.1:F
C2904 0.1:F
C2903 0.1:F
C2908 0.1:F
C2910 0.1:F
C2911 0.1:F
C2902 0.1:F
C2901
220:6.3
L2901 10:J
R2901 1.5K:1/10J
R2902 20K:1/10J
R2903 1K:1/10J
R2904 1K:1/10J
J2956 5.0
R1802 2.2K:1/10J
C1807 47:6.3
C1809 1:50
C1810 0.01:B
C1811 0.01:B
C1812 22P:SL
C1813 22P:SL
C1814 22P:SL
C1815 22P:SL
R1804 680:1/10J
R1805 680:1/10J
R1807 1K:1/10J
R1808 1K:1/10J
J1853 0:1/10Z
J1854 0:1/10Z
J1855 0:1/10Z
J2954 0:1/10Z
J2955 0:1/10Z
CN182
LP CH1
LP COMMON
LP CH2
SP CH2
SP COMMON
SP CH1
GND
AF+(CH1)
AF COMMON
AF-(CH2)
NC
NC
TO MECHANISM
VOLTAGE: REC(PLAY)MODE

VIDEO CIRCUIT WAVEFORMS

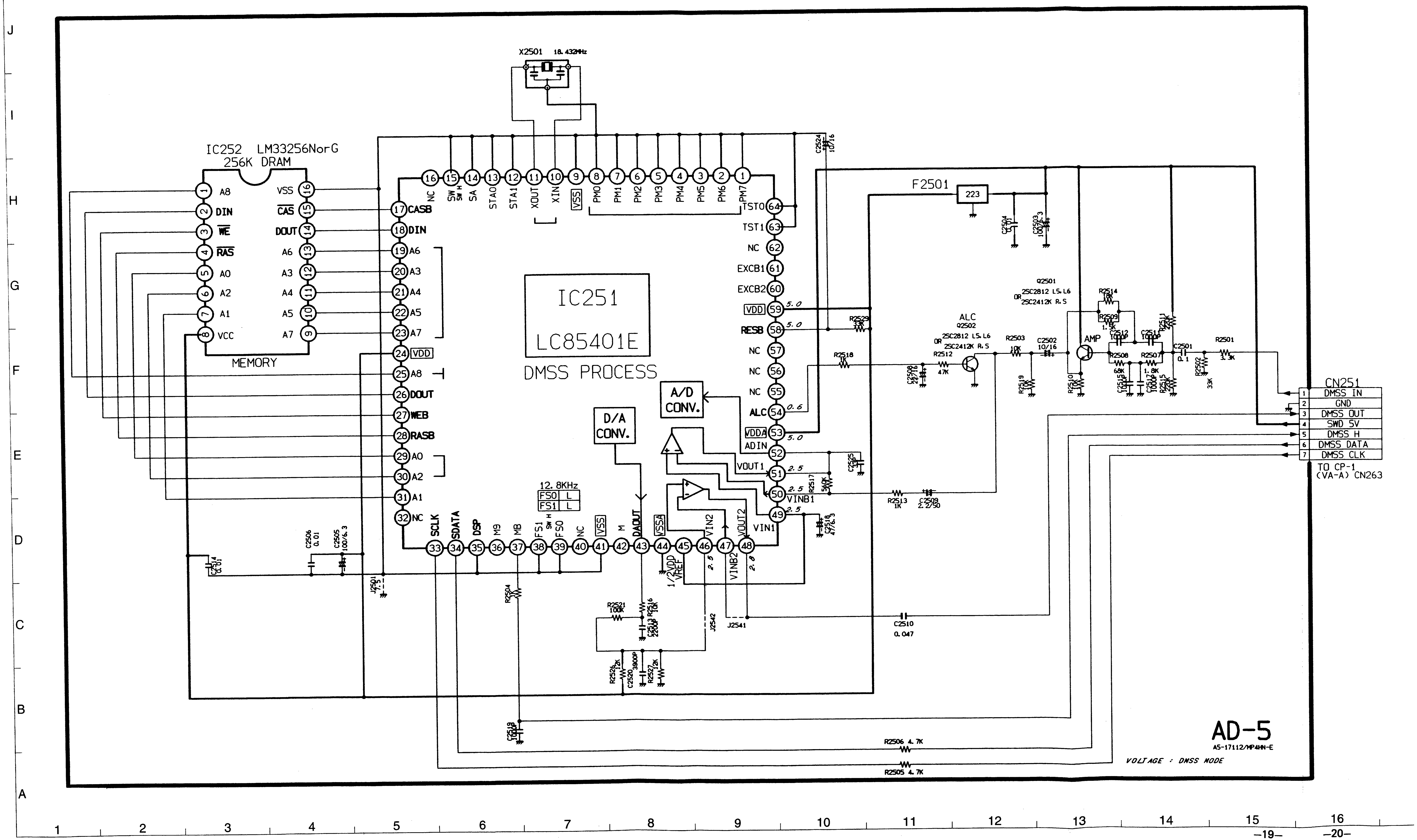
TEST LOCATION	WAVE FORM	TEST LOCATION	WAVE FORM
IC101 PIN14 REC 0.4Vp-p (REC C)		IC101 PIN37 REC, PLAY 4Vp-p (C SYNC)	
IC101 PIN15 PLAY 0.25Vp-p (PB Y, C)		IC101 PIN38 REC, PLAY 2Vp-p (VIDEO OUT)	
IC101 PIN18 REC 0.2Vp-p (REC Y)		IC101 PIN40, 42 REC, PLAY 0.35Vp-p	
IC101 PIN25, 26 REC, PLAY 0.5Vp-p		IC101 PIN45, 46 PLAY 0.4Vp-p	
IC101 PIN28 REC 1Vp-p (VIDEO IN)		IC101 PIN48, 50, 52 REC, PLAY 0.25Vp-p	

WF-V-PG2ZK

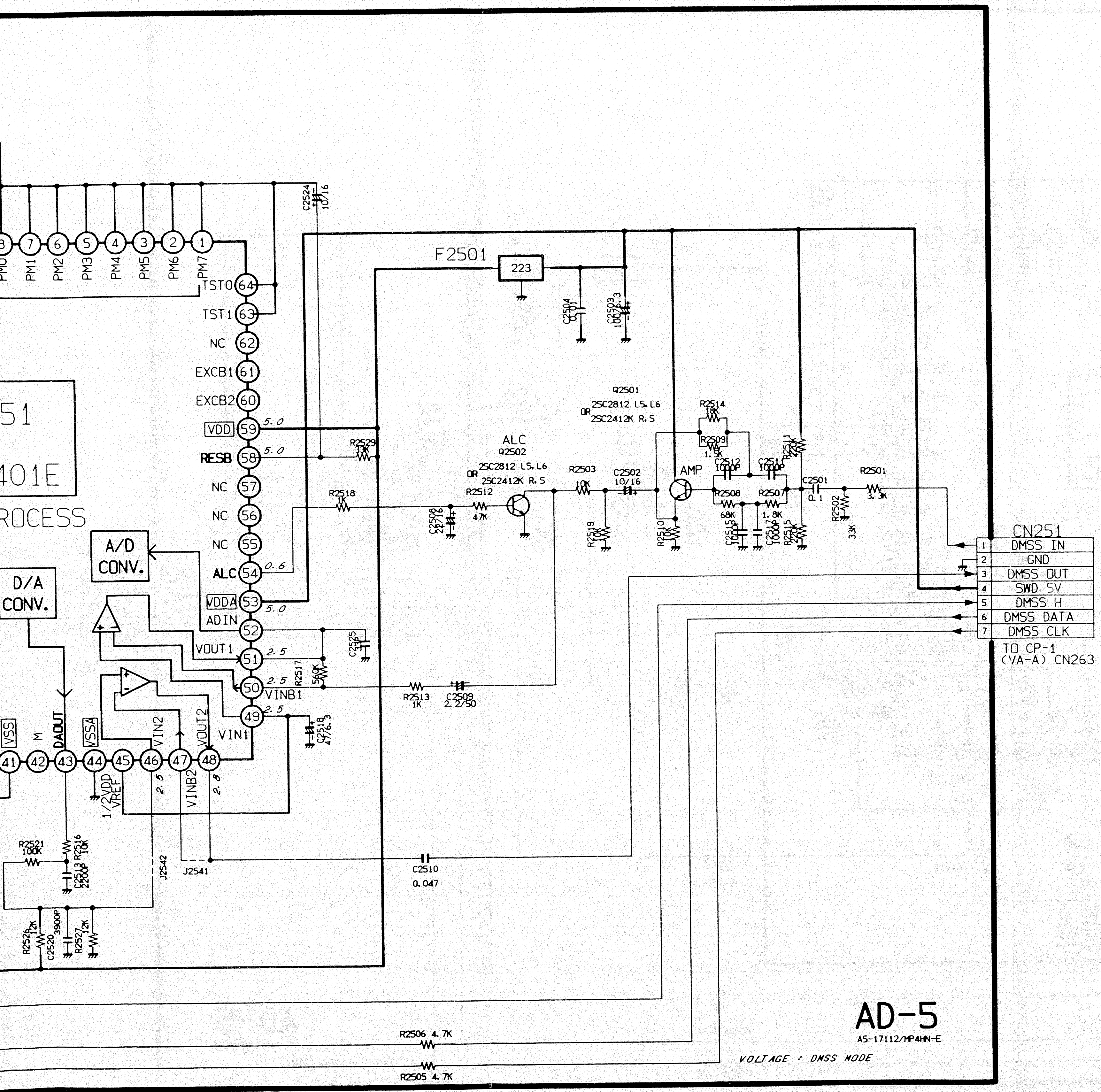
VP-1 P.W.B.


C2901
CN182
IC181
IC291
UP
L2901
J2991
C1809
C1807
J1856
CN181
J1857
J1852
J2956
TP183 (SW P)
TP182 (ENV.)
VP-1

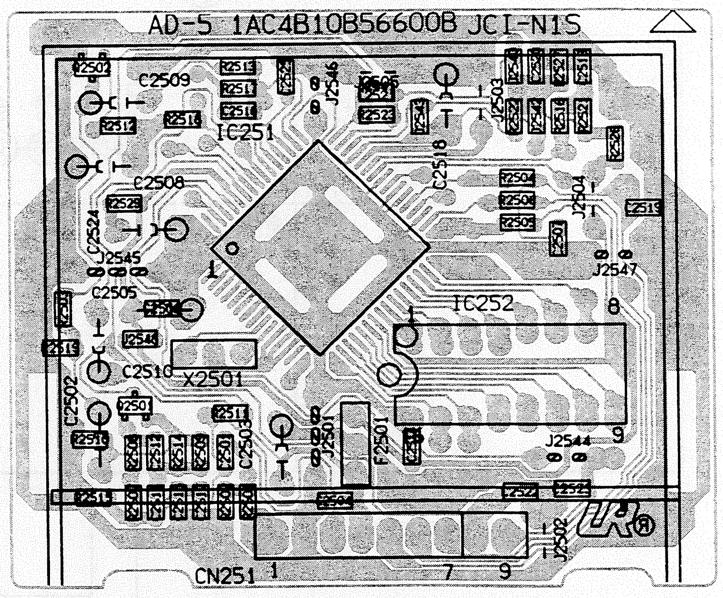
AD-5 BOARD DMSS PROCESS (VR 2781 ONLY)


X2501 18.432MHz
IC252 LM33256NorG
256K DRAM
MEMORY
A8
DIN
WE
RAS
A0
A2
A1
VCC
VSS
CAS
DOUT
A6
A3
A4
A5
A7
IC251
LC85401E
DMSS PROCESS
CASB
DIN
A6
A3
A4
A5
A7
VDD
A8
DOUT
WEB
RASB
A0
A2
A1
NC
SCLK
SDATA
DSP
M9
MB
FS1
FS0
NC
VSS
M
DAOUT
VSSA
1/2VDD VREF
VIN2
VINB2
VOUT2
VIN1
VINB1
VOUT1
ADIN
VDDA
ALC
NC
RESB
VDD
EXCB2
EXCB1
TST1
TST0
PM7
PM6
PM5
PM4
PM3
PM2
PM1
PM0
VSS
XIN
XOUT
STA1
STA0
SA
SW H
NC
12.8KHz
FS0 L
FS1 L
A/D CONV.
D/A CONV.
5.0
5.0
0.6
5.0
2.5
2.5
2.5
2.5
2.8
F2501
223
C2504
C2503 100/6.3
C2524 10/16
Q2501
2SC2812 LS.L6
OR 2SC2412K R.S
ALC
Q2502
2SC2812 LS.L6
OR 2SC2412K R.S
AMP
R2512 47K
R2503 10K
C2502 10/16
R2514 10K
R2509 1.5K
C2512 100P
C2511 100P
R2511 22K
R2508 68K
R2507 1.8K
R2515 22K
C2501 0.1
R2501 1.5K
R2502 33K
R2510 10K
R2519 10K
C2508 22/16
R2518
R2529
R2517 560K
C2525
R2513 1K
C2509 2.2/50
C2518 47/6.3
C2506 0.01
C2505 100/6.3
C2514 0.01
J2501 7.5
R2504 1K
R2521 100K
R2516 10K
C2513 2200P
J2542
J2541
R2526 12K
C2520 3900P
R2527 12K
C2510 0.047
C2519 100P
R2506 4.7K
R2505 4.7K
CN251
1 DMSS IN
2 GND
3 DMSS OUT
4 SWD 5V
5 DMSS H
6 DMSS DATA
7 DMSS CLK
TO CP-1 (VA-A) CN263
AD-5
A5-17112/MP4HN-E
VOLTAGE : DMSS MODE
K
J
I
H
G
F
E
D
C
B
A
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16

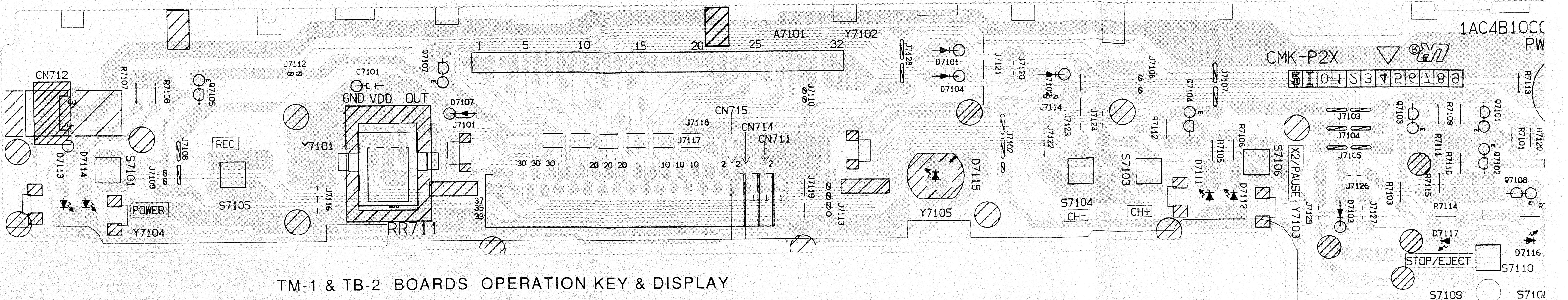
DMSS PROCESS (VR 2781 ONLY)


PM0
PM1
PM2
PM3
PM4
PM5
PM6
PM7
TST0 64
TST1 63
NC 62
EXCB1 61
EXCB2 60
VDD 59
RESB 58
NC 57
NC 56
NC 55
ALC 54
VDDA 53
ADIN 52
VOUT1 51
VINB1 50
49
VIN1
41 42 43 44 45 46 47 48
VSS
M
DADUT
VSSA
1/2VDD VREF
VIN2
VINB2
VOUT2
51
401E
ROCESS
A/D CONV.
D/A CONV.
F2501
223
C2524 10/16
C2504 0.01
C2503 100/6.3
Q2501 2SC2812 LS.L6 OR 2SC2412K R.S
ALC Q2502 2SC2812 LS.L6 OR 2SC2412K R.S
AMP
R2514 18K
R2509 1.5K
R2529 33K
R2518 1K
R2512 47K
R2503 10K
C2502 10/16
C2512 1000P
C2511 1000P
R2511 270K
C2501 0.1
R2501 3.3K
R2502 33K
R2508 68K
R2507 1.8K
C2508 22/16
R2519 10K
R2510
C2515
C2514
R2515 270K
C2525
R2517 560K
R2513 1K
C2509 2.2/50
C2518 47/6.3
R2521 100K
R2516 10K
C2513 2200P
J2542
J2541
C2510 0.047
R2526 12K
C2520 3900P
R2527 12K
5.0
0.6
2.5
2.8
CN251
1 DMSS IN
2 GND
3 DMSS OUT
4 SWD 5V
5 DMSS H
6 DMSS DATA
7 DMSS CLK
TO CP-1 (VA-A) CN263
R2506 4.7K
R2505 4.7K
AD-5
A5-17112/MP4HN-E
VOLTAGE : DMSS MODE
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23

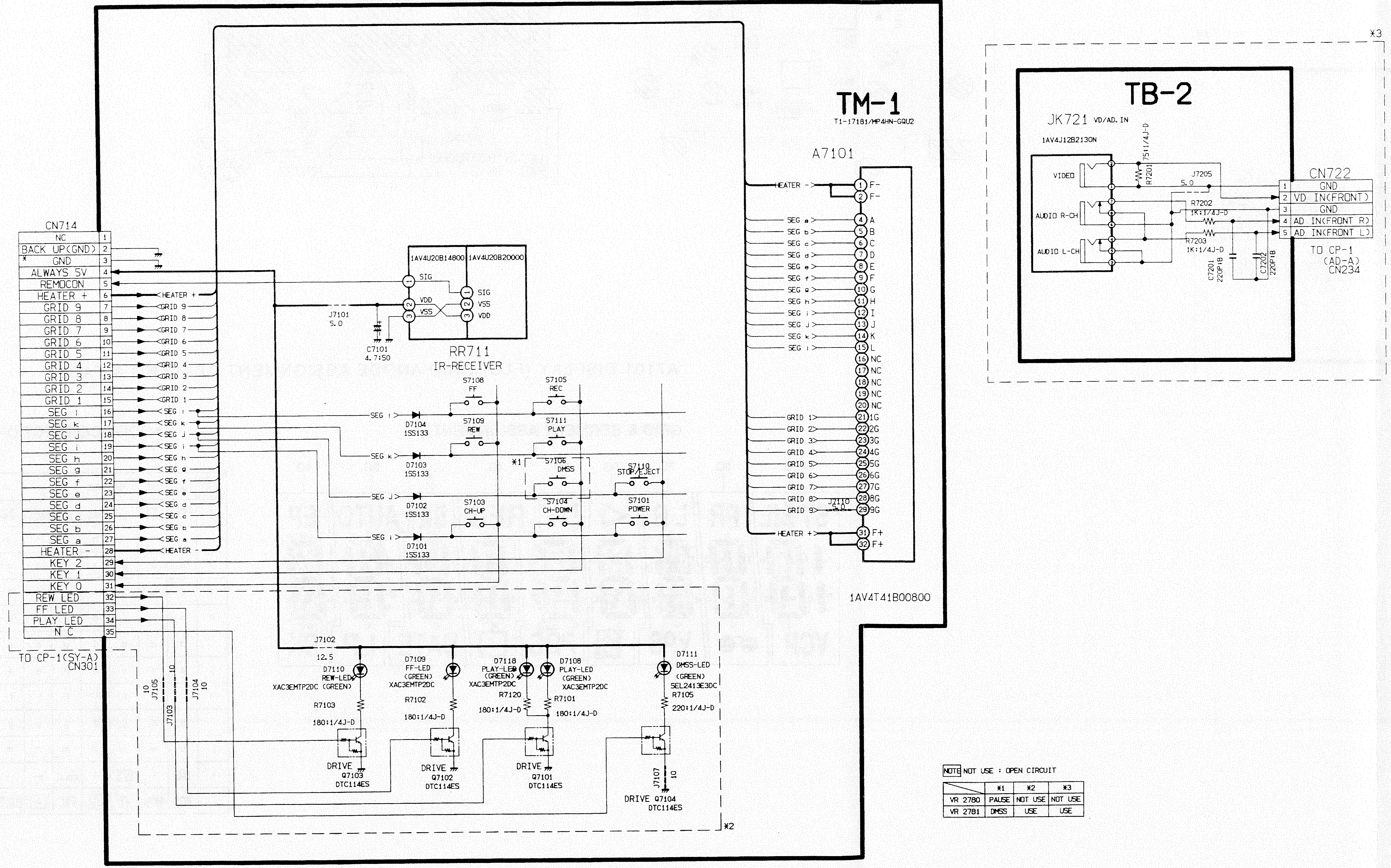
AD-5 P.W.B. (VR 2781 ONLY)

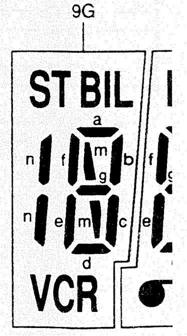

AD-5 1AC4B10B56600B JCI-N1S
IC251
IC252
X2501
C2509
C2508
C2505
C2510
C2502
C2518
C2524
C2503
J2545
J2546
J2547
J2544
J2501
J2502
J2503
J2504
F2501
CN251
1
7
9
8

TM-1 P.W.B


1AC4B10CC
PW
CMK-P2X
CN712
CN715
CN714
CN711
A7101
Y7102
Y7101
Y7104
Y7105
Y7103
RR711
GND VDD OUT
REC
POWER
S7101
S7105
S7103
S7104
CH-
CH+
S7106
X2/PAUSE
STOP/EJECT
S7110
D7115
D7117
D7116
R7107
R7108
Q7105
C7101
D7107
J7101
J7112
J7118
J7117
J7126
R7114
Q7108

TM-1 & TB-2 BOARDS OPERATION KEY & DISPLAY

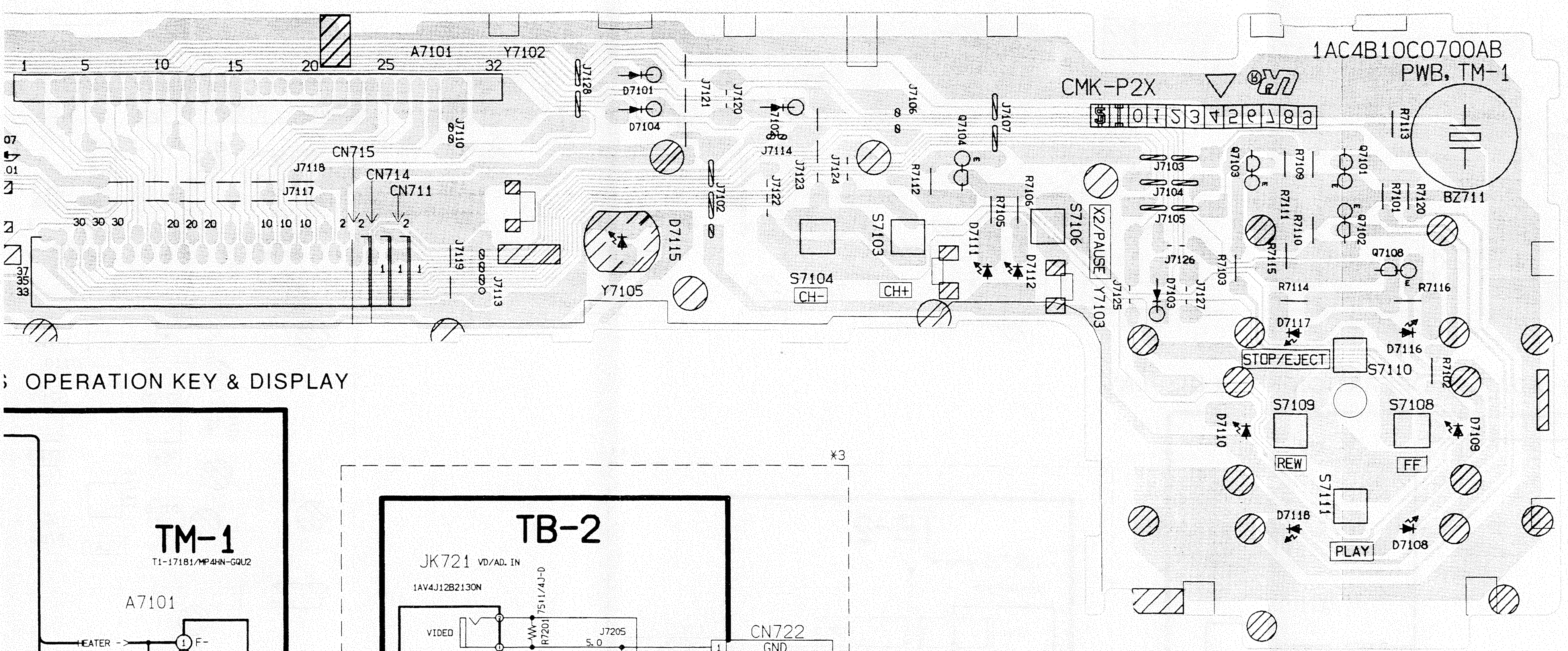

TM-1
T1-17181/MP4HN-GQU2
A7101
1AV4T41B00800
RR711
IR-RECEIVER
1AV4U20B14800
1AV4U20B20000
SIG
VDD
VSS
J7101
5.0
C7101
4.7:50
CN714
NC
BACK UP(GND)
GND
ALWAYS 5V
REMOCON
HEATER +
GRID 9
GRID 8
GRID 7
GRID 6
GRID 5
GRID 4
GRID 3
GRID 2
GRID 1
SEG l
SEG k
SEG j
SEG i
SEG h
SEG g
SEG f
SEG e
SEG d
SEG c
SEG b
SEG a
HEATER -
KEY 2
KEY 1
KEY 0
REW LED
FF LED
PLAY LED
N C
TO CP-1(SY-A)
CN301
S7108 FF
S7105 REC
S7109 REW
S7111 PLAY
S7106 DMSS
S7110 STOP/EJECT
S7103 CH-UP
S7104 CH-DOWN
S7101 POWER
D7104 1SS133
D7103 1SS133
D7102 1SS133
D7101 1SS133
J7102 12.5
D7110 REW-LED XAC3EMTP2DC (GREEN)
D7109 FF-LED (GREEN) XAC3EMTP2DC
D7118 PLAY-LED (GREEN) XAC3EMTP2DC
D7108 PLAY-LED (GREEN) XAC3EMTP2DC
D7111 DMSS-LED (GREEN) SEL2413E3DC
R7103 180:1/4J-D
R7102 180:1/4J-D
R7120 180:1/4J-D
R7101 180:1/4J-D
R7105 220:1/4J-D
DRIVE Q7103 DTC114ES
DRIVE Q7102 DTC114ES
DRIVE Q7101 DTC114ES
DRIVE Q7104 DTC114ES
J7105
J7103
J7104
J7107
J7110
*1
*2
*3
TB-2
JK721 VD/AD. IN
1AV4J12B2130N
VIDEO
AUDIO R-CH
AUDIO L-CH
R7201 75:1/4J-D
J7205 5.0
R7202 1K:1/4J-D
R7203 1K:1/4J-D
C7201 220P:B
C7202 220P:B
CN722
GND
VD IN(FRONT)
GND
AD IN(FRONT R)
AD IN(FRONT L)
TO CP-1 (AD-A) CN234


9G
ST BIL
VCR

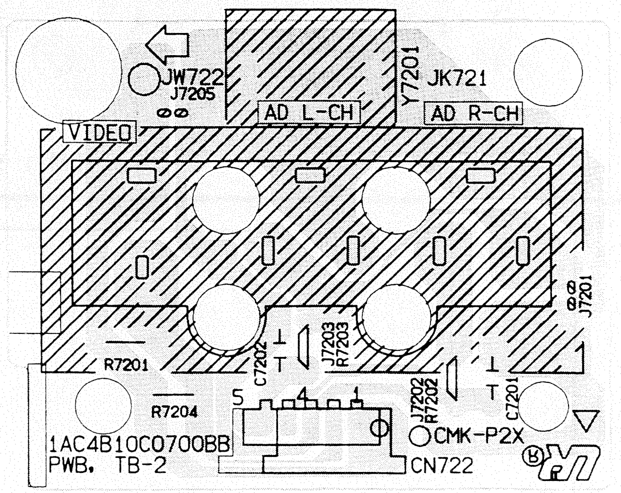
NOTE NOT USE : OPEN CIRCUIT

	*1	*2	*3
VR 2780	PAUSE	NOT USE	NOT USE
VR 2781	DMSS	USE	USE

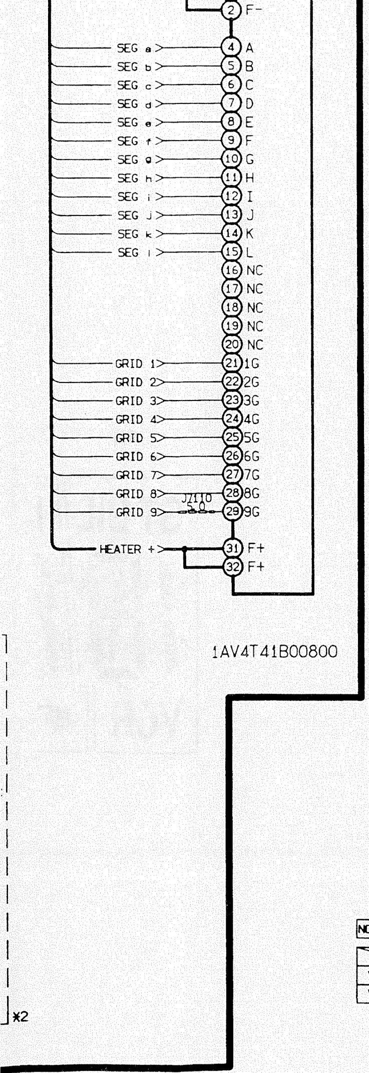
TM-1 P.W.B

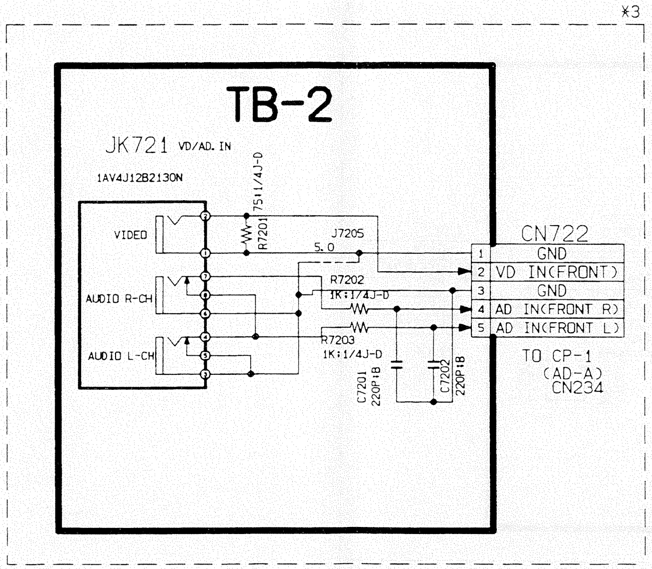

1AC4B10C0700AB
PWB, TM-1
CMK-P2X
A7101
Y7102
Y7105
Y7103
BZ711
CN715
CN714
CN711
D7101
D7104
D7115
S7104
CH-
S7103
CH+
S7106
X2/PAUSE
STOP/EJECT
S7110
S7109
REW
S7108
FF
S7111
PLAY
D7117
D7116
D7110
D7109
D7118
D7108
Q7108
R7114
R7116

TB-2 P.W.B. (VR 2781 ONLY)


JW722
J7205
JK721
AD L-CH
AD R-CH
Y7201
VIDEO
J7201
R7201
R7204
C7202
J7203
R7203
J7202
R7202
C7201
1AC4B10C0700BB
PWB, TB-2
CMK-P2X
CN722

OPERATION KEY & DISPLAY


TM-1
T1-17181/MP4HN-GRU2
A7101
HEATER
SEG a
SEG b
SEG c
SEG d
SEG e
SEG f
SEG g
SEG h
SEG i
SEG j
SEG k
SEG l
GRID 1
GRID 2
GRID 3
GRID 4
GRID 5
GRID 6
GRID 7
GRID 8
GRID 9
HEATER
F-
F-
A
B
C
D
E
F
G
H
I
J
K
L
NC
1G
2G
3G
4G
5G
6G
7G
8G
9G
F+
F+
J7110
1AV4T41B00800
*2

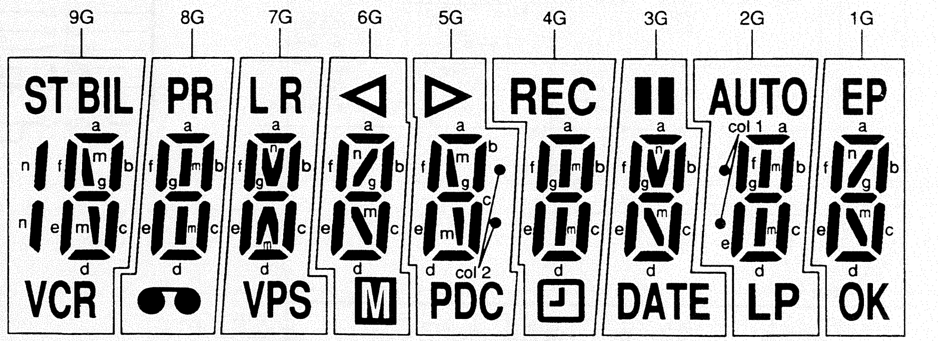

*3
TB-2
JK721 VD/AD. IN
1AV4J12B2130N
VIDEO
AUDIO R-CH
AUDIO L-CH
R7201
75 1/4J-D
J7205
5.0
R7202
1K 1/4J-D
R7203
1K 1/4J-D
C7201
220P B
C7202
220P B
CN722
1 GND
2 VD IN(FRONT)
3 GND
4 AD IN(FRONT R)
5 AD IN(FRONT L)
TO CP-1
(AD-A)
CN234

NOTE NOT USE : OPEN CIRCUIT

	*1	*2	*3
VR 2780	PAUSE	NOT USE	NOT USE
VR 2781	DMSS	USE	USE

A7101 DISPLAY (FLD) GRID/ANODE ASSIGNMENT DRAWING & TABLE

GRID & SEGMENT ASSIGNMENT

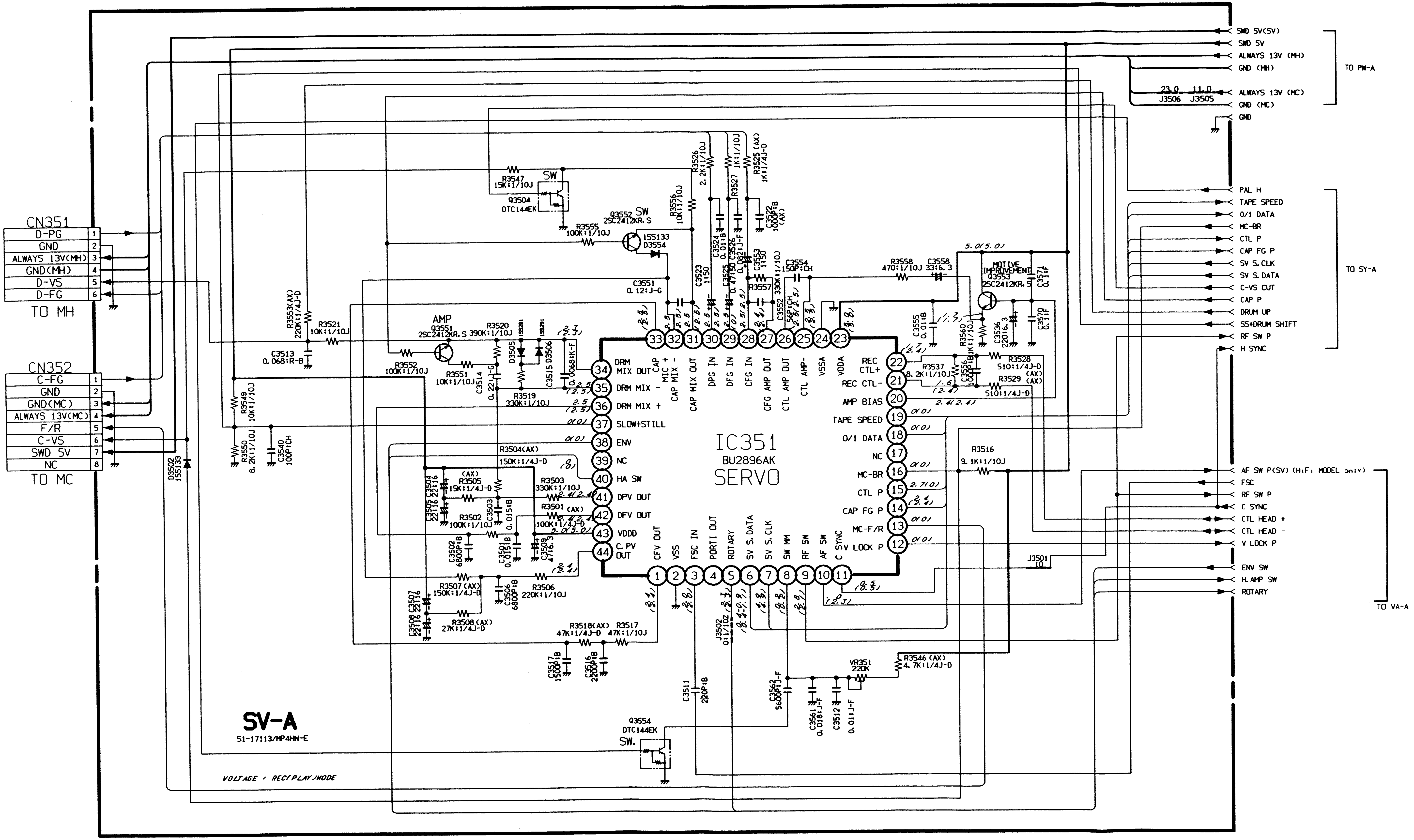

9G
8G
7G
6G
5G
4G
3G
2G
1G
ST BIL
PR
L R
◁
▷
REC
▮▮
AUTO
EP
a
b
c
d
e
f
g
h
m
n
col 1
col 2
VCR
VPS
M
PDC
DATE
LP
OK

ANODE CONNECTION

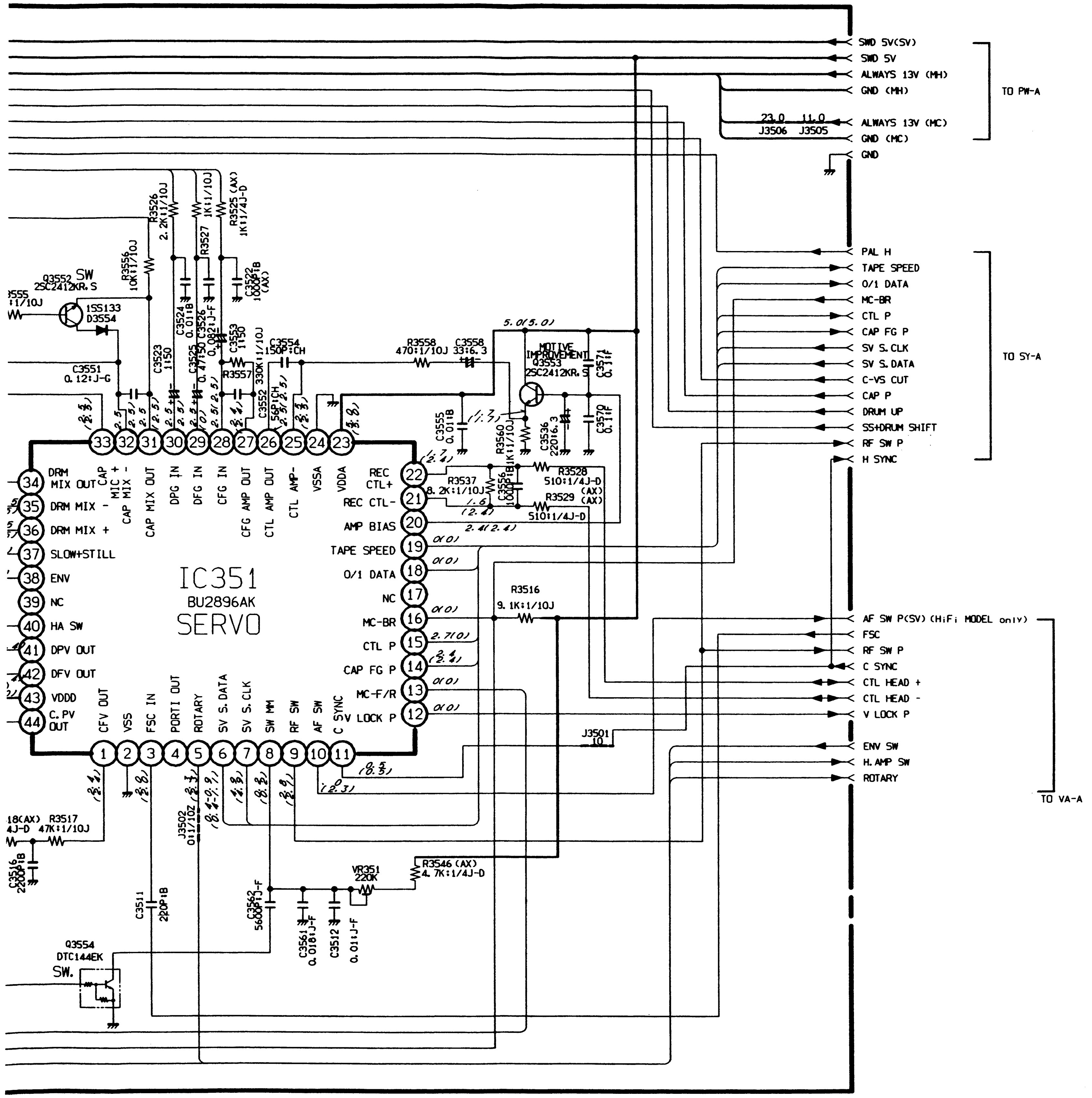
SEGMENT \ GRID	9G	8G	7G	6G	5G	4G	3G	2G	1G
a	ST	PR	L	◁	▷	REC	▮▮	AUTO	EP
b	n	—	n	n	—	—	n	—	n
c	a	a	a	a	a	a	a	a	a
d	b	b	b	b	b	b	b	b	b
e	c	c	c	c	c	c	c	c	c
f	d	d	d	d	d	d	d	d	d
g	e	e	e	e	e	e	e	e	e
h	f	f	f	f	f	f	f	f	f
i	g	g	g	g	g	g	g	g	g
j	m	m	m	m	m	m	m	m	m
k	BIL	—	VPS	—	col 2	—	—	col 1	—
l	VCR	●●	R	M	PDC	⊡	DATE	LP	OK

GR-00800

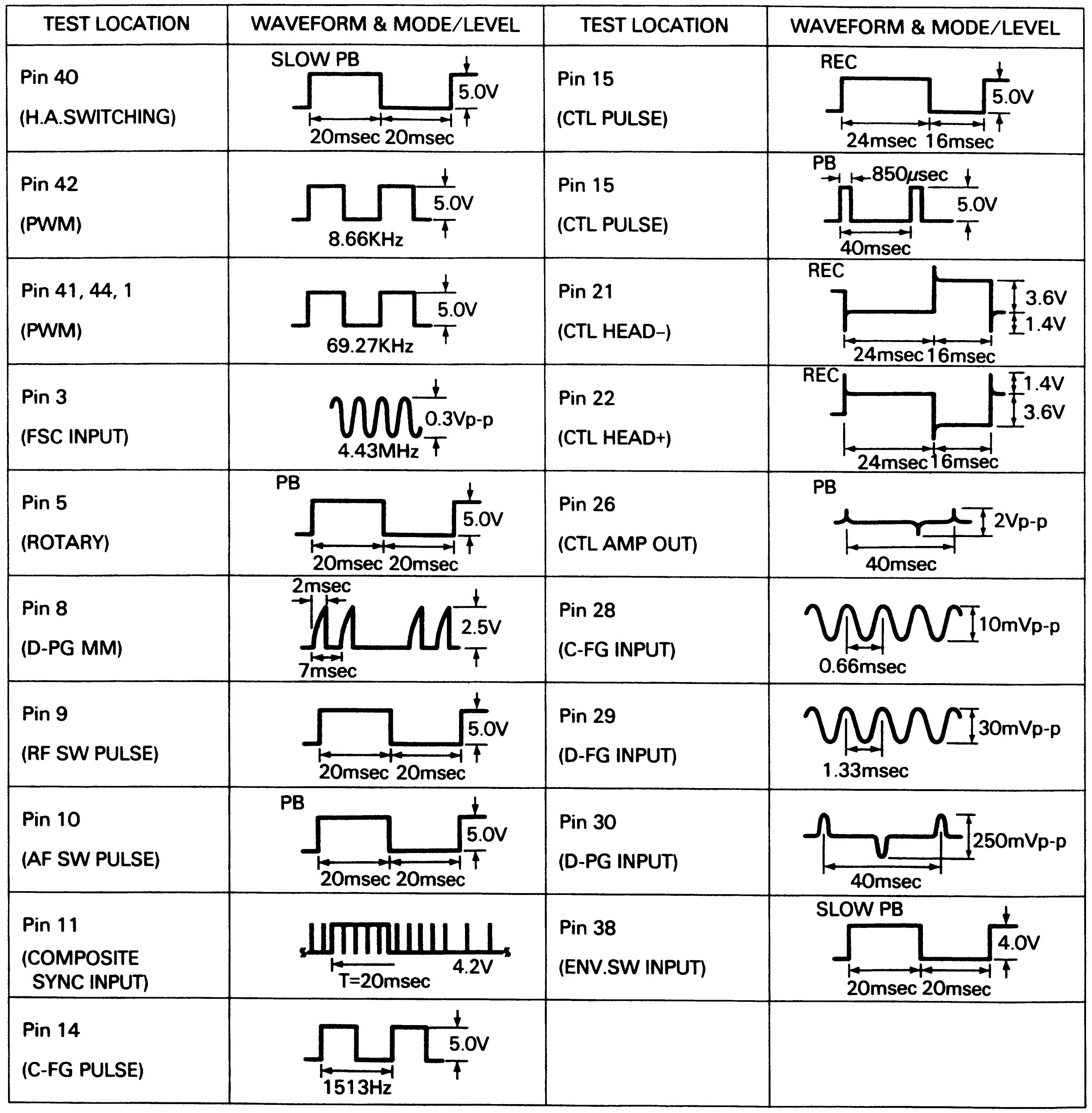
CP-1 BOARD (SV-A) SERVO


CN351
D-PG
GND
ALWAYS 13V(MH)
GND(MH)
D-VS
D-FG
TO MH
CN352
C-FG
GND
GND(MC)
ALWAYS 13V(MC)
F/R
C-VS
SWD 5V
NC
TO MC
IC351
BU2896AK
SERVO
DRM MIX OUT
DRM MIX -
DRM MIX +
SLOW+STILL
ENV
NC
HA SW
DPV OUT
DFV OUT
VDDD
C.PV OUT
CAP MIC +
CAP MIX -
CAP MIX OUT
DPG IN
DFG IN
CFG IN
CFG AMP OUT
CTL AMP OUT
CTL AMP-
VSSA
VDDA
REC CTL+
REC CTL-
AMP BIAS
TAPE SPEED
0/1 DATA
NC
MC-BR
CTL P
CAP FG P
MC-F/R
V LOCK P
CFV OUT
VSS
FSC IN
PORTI OUT
ROTARY
SV S.DATA
SV S.CLK
SW MM
RF SW
AF SW
C SYNC
AMP
Q3551
2SC2412KR.S
Q3504
DTC144EK
SW
Q3552
2SC2412KR.S
1SS133
D3554
MOTIVE IMPROVEMENT
Q3553
2SC2412KR.S
Q3554
DTC144EK
SW.
D3502
1SS133
VR351
220K
J3501
J3502
J3505
J3506
23.0
11.0
SWD 5V(SV)
SWD 5V
ALWAYS 13V (MH)
GND (MH)
ALWAYS 13V (MC)
GND (MC)
GND
TO PW-A
PAL H
TAPE SPEED
0/1 DATA
MC-BR
CTL P
CAP FG P
SV S.CLK
SV S.DATA
C-VS CUT
CAP P
DRUM UP
SS+DRUM SHIFT
RF SW P
H SYNC
TO SY-A
AF SW P(SV) (HiFi MODEL only)
FSC
RF SW P
C SYNC
CTL HEAD +
CTL HEAD -
V LOCK P
ENV SW
H.AMP SW
ROTARY
TO VA-A
SV-A
S1-17113/MP4HN-E
VOLTAGE : REC(PLAY)MODE

SERV
TES
Pin 40 (H.A.S
Pin 42 (PWM
Pin 41 (PWM
Pin 3 (FSC I
Pin 5 (ROTA
Pin 8 (D-PG
Pin 9 (RF SV
Pin 10 (AF SV
Pin 11 (COMI SYNC
Pin 14 (C-FG


SWD 5V(SV)
SWD 5V
ALWAYS 13V (MH)
GND (MH)
ALWAYS 13V (MC)
GND (MC)
GND
TO PW-A
23.0
11.0
J3506
J3505
PAL H
TAPE SPEED
0/1 DATA
MC-BR
CTL P
CAP FG P
SV S.CLK
SV S.DATA
C-VS CUT
CAP P
DRUM UP
SS+DRUM SHIFT
RF SW P
H SYNC
TO SY-A
AF SW P(SV) (HiFi MODEL only)
FSC
RF SW P
C SYNC
CTL HEAD +
CTL HEAD -
V LOCK P
ENV SW
H.AMP SW
ROTARY
TO VA-A
IC351
BU2896AK
SERVO
DRM MIX OUT
DRM MIX -
DRM MIX +
SLOW+STILL
ENV
NC
HA SW
DPV OUT
DFV OUT
VDDD
C.PV OUT
CFV OUT
VSS
FSC IN
PORT1 OUT
ROTARY
SV S.DATA
SV S.CLK
SW MM
RF SW
AF SW
C SYNC
V LOCK P
MC-F/R
CAP FG P
CTL P
MC-BR
NC
O/1 DATA
TAPE SPEED
AMP BIAS
REC CTL-
REC CTL+
VDDA
VSSA
CTL AMP-
CTL AMP OUT
CFG AMP OUT
CFG IN
DFG IN
DPG IN
CAP MIX OUT
CAP MIX -
CAP MIC +
Q3552 SW 2SC2412KR.S
1SS133 D3554
Q3553 2SC2412KR.S
MOTIVE IMPROVEMENT
Q3554 DTC144EK SW.
R3558 470:1/10J
C3558 33:6.3
R3516 9.1K:1/10J
R3537 8.2K:1/10J
R3528 510:1/4J-D (AX)
R3529 510:1/4J-D (AX)
R3517 47K:1/10J
R3546 (AX) 4.7K:1/4J-D
VR351 220K
R3526 2.2K:1/10J
R3525 (AX) 1K:1/4J-D
R3527 1K:1/10J
R3556 10K:1/10J
C3551 0.12:J-G
C3554 150P:CH
J3501
J3502
5.0(5.0)

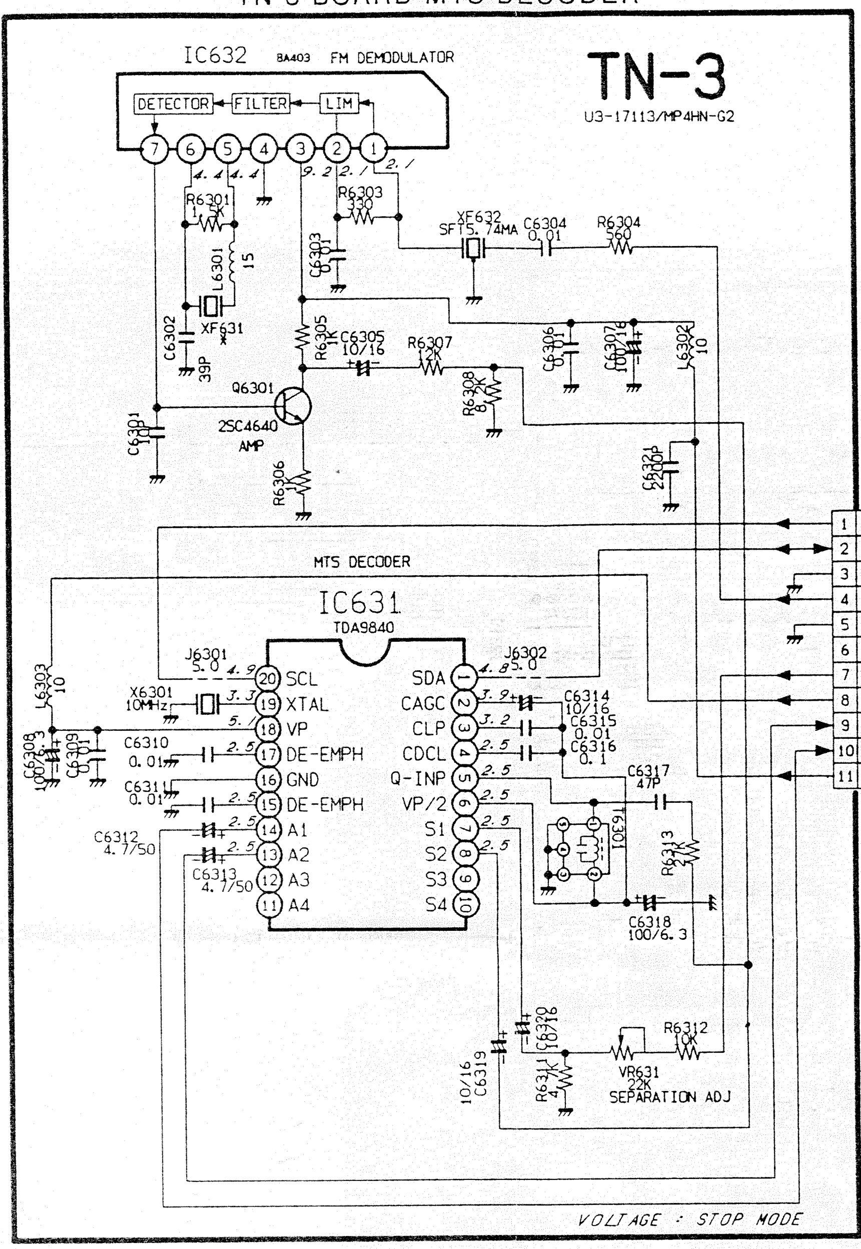
SERVO CIRCUIT WAVEFORMS

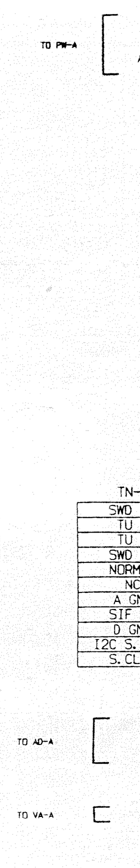


TEST LOCATION	WAVEFORM & MODE/LEVEL	TEST LOCATION	WAVEFORM & MODE/LEVEL
Pin 40 (H.A.SWITCHING)	SLOW PB 5.0V 20msec 20msec	Pin 15 (CTL PULSE)	REC 5.0V 24msec 16msec
Pin 42 (PWM)	5.0V 8.66KHz	Pin 15 (CTL PULSE)	PB 850μsec 5.0V 40msec
Pin 41, 44, 1 (PWM)	5.0V 69.27KHz	Pin 21 (CTL HEAD-)	REC 3.6V 1.4V 24msec 16msec
Pin 3 (FSC INPUT)	0.3Vp-p 4.43MHz	Pin 22 (CTL HEAD+)	REC 1.4V 3.6V 24msec 16msec
Pin 5 (ROTARY)	PB 5.0V 20msec 20msec	Pin 26 (CTL AMP OUT)	PB 2Vp-p 40msec
Pin 8 (D-PG MM)	2msec 2.5V 7msec	Pin 28 (C-FG INPUT)	10mVp-p 0.66msec
Pin 9 (RF SW PULSE)	5.0V 20msec 20msec	Pin 29 (D-FG INPUT)	30mVp-p 1.33msec
Pin 10 (AF SW PULSE)	PB 5.0V 20msec 20msec	Pin 30 (D-PG INPUT)	250mVp-p 40msec
Pin 11 (COMPOSITE SYNC INPUT)	4.2V T=20msec	Pin 38 (ENV.SW INPUT)	SLOW PB 4.0V 20msec 20msec
Pin 14 (C-FG PULSE)	5.0V 1513Hz		

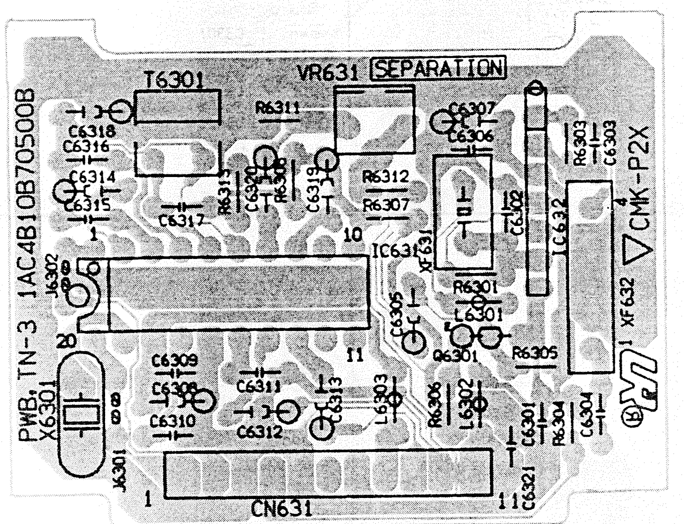
WF-S-TP4

TN-3 BOARD MTS DECODER


IC632 BA403 FM DEMODULATOR
DETECTOR
FILTER
LIM
TN-3
U3-17113/MP4HN-G2
XF632 SF15.74MA
Q6301 2SC4640 AMP
XF631
MTS DECODER
IC631 TDA9840
X6301 10MHz
SCL
XTAL
VP
DE-EMPH
GND
DE-EMPH
A1
A2
A3
A4
SDA
CAGC
CLP
CDCL
Q-INP
VP/2
S1
S2
S3
S4
CN631
1 S. CLK
2 I2C S. DATA
3 GND
4 SIF IN
5 GND
6 NC
7 NORMAL
8 SWD 5V
9 TU R OUT
10 TU L OUT
11 SWD 9V
TO CP-1(SY-A)
VR631 SEPARATION ADJ
VOLTAGE : STOP MODE


TO PW-A
TO AD-A
TO VA-A

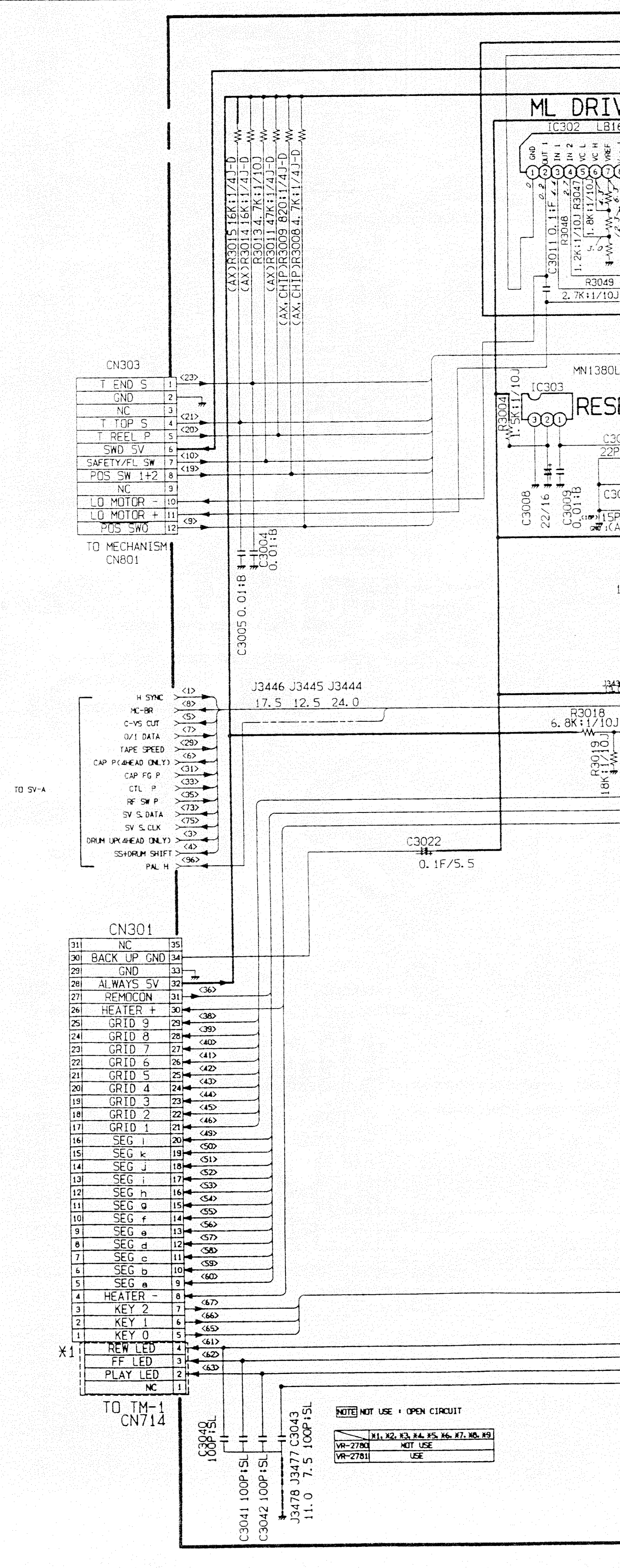
TN-3 P.W.B.


T6301
VR631 SEPARATION
IC631
IC632
CN631
X6301
PWB, TN-3 1AC4B10B0500B
CMK-P2X
XF632

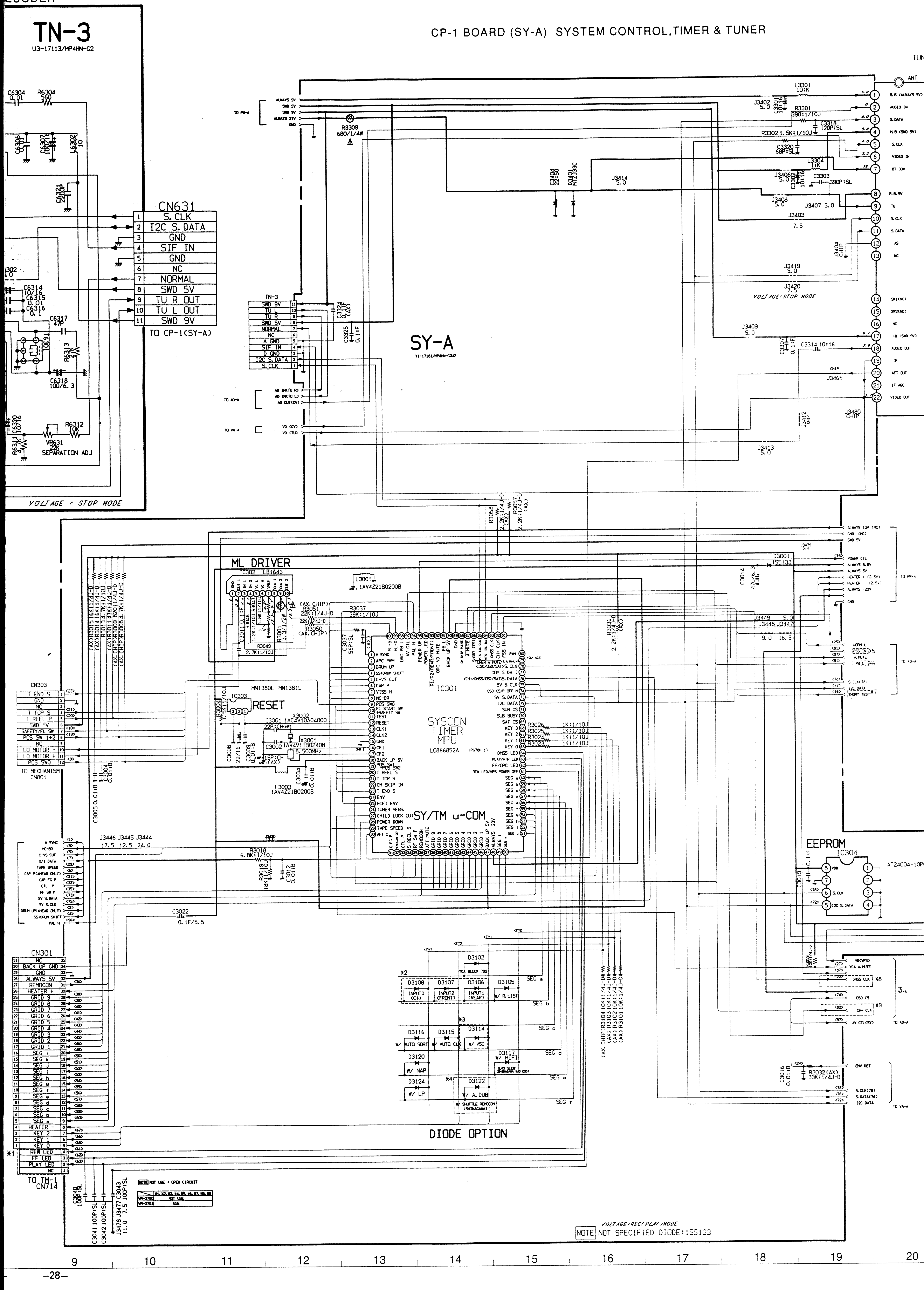
IC301 SYSTEM CONTROL,TIMER & TUNING CONTROL MPU PIN FUNCTIONS TABLE

No.	Name	I/O	H/L	I/O Signal Function
1	H SYNC	I	-	Sync. signal input for existing channel discrimination and TV system discrimination.
2	APC PWM	O	-	Signal to control video recording current EQ-amp.
3	DRUM UP	O	H	Head drum motor rotation speed up signal.
4	SS + DRUM SHIFT	O	-	Signal for indicating SLOW/STILL modes and alternation of drum motor control data. (3 value voltage)
5	C - Vs CUT	O	H	Cut off for capstan motor control voltage in SLOW / STILL modes.
6	CAP P.	O	H	Gain down control for Head Motor at SLOW mode.
7	VISS H	I	H	CTL pulse duty detection signal input. Used for VISS detection.
8	MC - BR	O	H	Brake signal for capstan motor.
9	POS SW0	I	L	Data indicating operation position of mechanism. (0V : SEARCH,STILL,SLOW,STOP,PLAY, and REC modes) (5V : EJECT,REW, and INITIAL modes)
10	FL- START + SAFETY SW	I	L	Switch input indicating start of cassette loading or discharge by cassette mechanism and detecting accidental erasure prevention tab of cassette tape.
11	-	-	-	-
12	RESET	I	L	Initial reset terminal for this IC.
13	CLK 1	-	-	Clock OSC during power failures.
14	CLK 2	-	-	Frequency is 32kHz.
15	VSS	-	-	Ground terminal
16	CF 1	-	-	IC clock OSC terminal.
17	CF 2	-	-	Frequency is 8.5MHz.
18	VDD	-	-	IC power supply terminal. (5Vdc)
19	POS SW1+2	I	-	Data indicating operation position of mechanism. (2V: EJECT,REW ,and INITIAL modes) (3.4V: STOP, PLAY,REC, and F-SEARCH modes) (2.5V: STILL and SLOW modes) (5V: R-SEARCH mode)
20	T. REEL S.	I	-	Pulse input for detection of take-up reel table rotation.
21	T. TOP S.	I	L	Sensor signal input for tape beginning detection.
22	CM SKIP IN	I	-	CM-DET signal input.
23	T. END S.	I	L	Sensor signal input for tape end detection.
24	ENV.	I	-	Video head envelope detection signal input for ATR function.
25	HiFi ENV.	I	-	Hi-Fi audio head envelope detection signal input for ATR function. (Hi-Fi model only)
26	TUNER SENS	-	-	NOT USE
27	YCA MUTE	O	H	Signal to disable audio signal output.
28	POWER DOWN	I	L	Power failure detection terminal.
29	TAPE SPEED	I	-	Input of result of tape speed discrimination by digital servo IC.
30	AFT - C	I	-	Tuner AFT S-curve signal input for tuner AFT control.
31	C - FG P.	I	-	FG signal input of capstan motor.
32	MESECAM DET	I	-	Signal for indicating MESECAM mode.
33	CTL P.	I	-	CTL head recording / playback pulse signal input.
34	S REEL P	I	-	NOT USE
35	RF SW P.	I	-	RF switching pulse input, created by head drum PG.
36	REMOCON	I	-	Remote control signal input.
37	AFT MUTE	O	H	"H" output during TU AFT mute. (V-syn model only)
38	G9	O	-	Display grid outputs (FLD).
39	G8	O	-	
40	G7	O	-	
41	G6	O	-	
42	G5	O	-	
43	G4	O	-	
44	G3	O	-	
45	G2	O	-	
46	G1	O	-	
47	VDD	-	-	IC power supply input.(5Vdc)
48	V LOAD	-	-	-23V input for FLD drive.
49	SEG l	O	-	Display segment outputs (FLD). (Includes key-scan output)
50	SEG k	O	-	
51	SEG j	O	-	
52	SEG i	O	-	
53	SEG h	O	-	Display segment outputs (FLD). (Includes key-scan output)
54	SEG g	O	-	
55	SEG f	O	-	
56	SEG e	O	-	
57	SEG d	O	-	
58	SEG c	O	-	
59	SEG b	O	-	
60	SEG a	O	-	
61	REW LED	O	H	Signal for indicating REW mode.
	VPS P OFF	O	H	Signal to disable power LED while OPC-DET is working.
62	FF/OPC LED	O	H	Signal for indicating FF or OPC mode.
63	PLAY/ATR LED	O	H	Signal for indicating PLAY or ATR mode.
64	DMSS LED	O	H	Signal for indicating DMSS mode.
65	KEY IN 0	I	-	Operation key data inputs.
66	KEY IN 1	I	-	
67	KEY IN 2	I	-	
68	KEY IN 3	I	-	
69	SAT CS	O	H	Chip enable signal to satellite control IC.
70	SUB BUSY	I	H	NOT USE
71	SUB CS	O	H	NOT USE
72	I2C S.DATA	I/O	-	Data exchange with I2C ROM, TUNER and video-audio IC.
73	SV S. DATA	O	-	Output 8-bit X 4 serial data giving operation mode and tracking data, etc., to digital servo IC.
74	OSD CS	O	H	Chip enable (access) signal output to OSD IC.
	POWER OFF MUTE	H	O	"H" output when power is off, for disable output signal.
75	SV S. CLK	O	-	The clock pulse for digital servo IC.(TUNER,VA-A)
76	COMMON DATA	O	-	Terminal for communication of respective data with OSD IC,DMSS IC, SAT CTL IC and CH+ IC.
77	COM S DA I	-	-	NOT USE
78	COMMON CLK	O	-	The clock pulse for TUNER, video-audio IC,OSD IC, satellite control IC and E2P ROM.
79	TUNER A MUTE	O	L	Signal for disable the tuner audio signal.(HiFi set)
80	TU PWM	O	-	Tuning voltage output (PWM signal). (V-syn model)
81	FSS IN	I	-	CH+ mode control signal input (CH+ model).
82	CH PLUS CLK	O	-	The clock pulse for CH+ in/out-select IC.(CH+ model)
83	DMSS CLK	O	-	Clock signal for audio DMSS unit.
84	MTS I2C DA	I/O	-	Data signal for MTS decoder.
85	MTS I2C CLK	O	-	Clock signal for MTS decoder.
86	SHORT TEST	I	I	REC mode indication signal input. (NOT USE)
87	A MUTE	O	L	"L" output for disable audio output signal.
88	CM SKIP PULSE	O	-	Pulse to sample-hold timing for CM-detector.
89	VSS	-	-	IC ground terminal.
90	VDD	-	-	IC power supply input.(5Vdc)
91	PB L	O	L	Signal for indicating playback mode.
92	ORC VD MUTE	O	H	"H" output for disable video output signal during detection of tape character.
93	R1/R2	O	-	Signal for selecting AV-input(video/audio)source.(R1:L)
94	POWER LED	-	-	NOT USE
95	POWER UP	O	H	"HIGH" output except when power is off. Indicating that power is ON.
96	PAL H	O	H	Signal to indicate "PAL" mode.
97	AV CTL	O	-	Audio input source selecting for audio IC.
98	ORC PB L	O	L	Signal to indicated "ORC PB" mode
99	ML- D	O	-	Loading motor rotation direction (FWD / REV) indication signal.
100	ML- S	O	-	Loading motor rotation speed (low / medium / high) indication signal.

MP_IC301_C


ML DRIV
IC302
MN1380L
IC303
RES
CN303
T END S
GND
NC
T TOP S
T REEL P
SWD 5V
SAFETY/FL SW
POS SW 1+2
NC
LD MOTOR -
LD MOTOR +
POS SW0
TO MECHANISM CN801
TO SV-A
H SYNC
MC-BR
C-VS CUT
S/I DATA
TAPE SPEED
CAP P(4HEAD ONLY)
CAP FG P
CTL P
RF SW P
SV S.DATA
SV S.CLK
DRUM UP(4HEAD ONLY)
SS+DRUM SHIFT
PAL H
J3446 J3445 J3444
17.5 12.5 24.0
C3022 0.1F/5.5
CN301
NC
BACK UP GND
GND
ALWAYS 5V
REMOCON
HEATER +
GRID 9
GRID 8
GRID 7
GRID 6
GRID 5
GRID 4
GRID 3
GRID 2
GRID 1
SEG l
SEG k
SEG j
SEG i
SEG h
SEG g
SEG f
SEG e
SEG d
SEG c
SEG b
SEG a
HEATER -
KEY 2
KEY 1
KEY 0
REW LED
FF LED
PLAY LED
NC
TO TM-1 CN714
NOTE NOT USE : OPEN CIRCUIT

CP-1 BOARD (SY-A) SYSTEM CONTROL,TIMER & TUNER

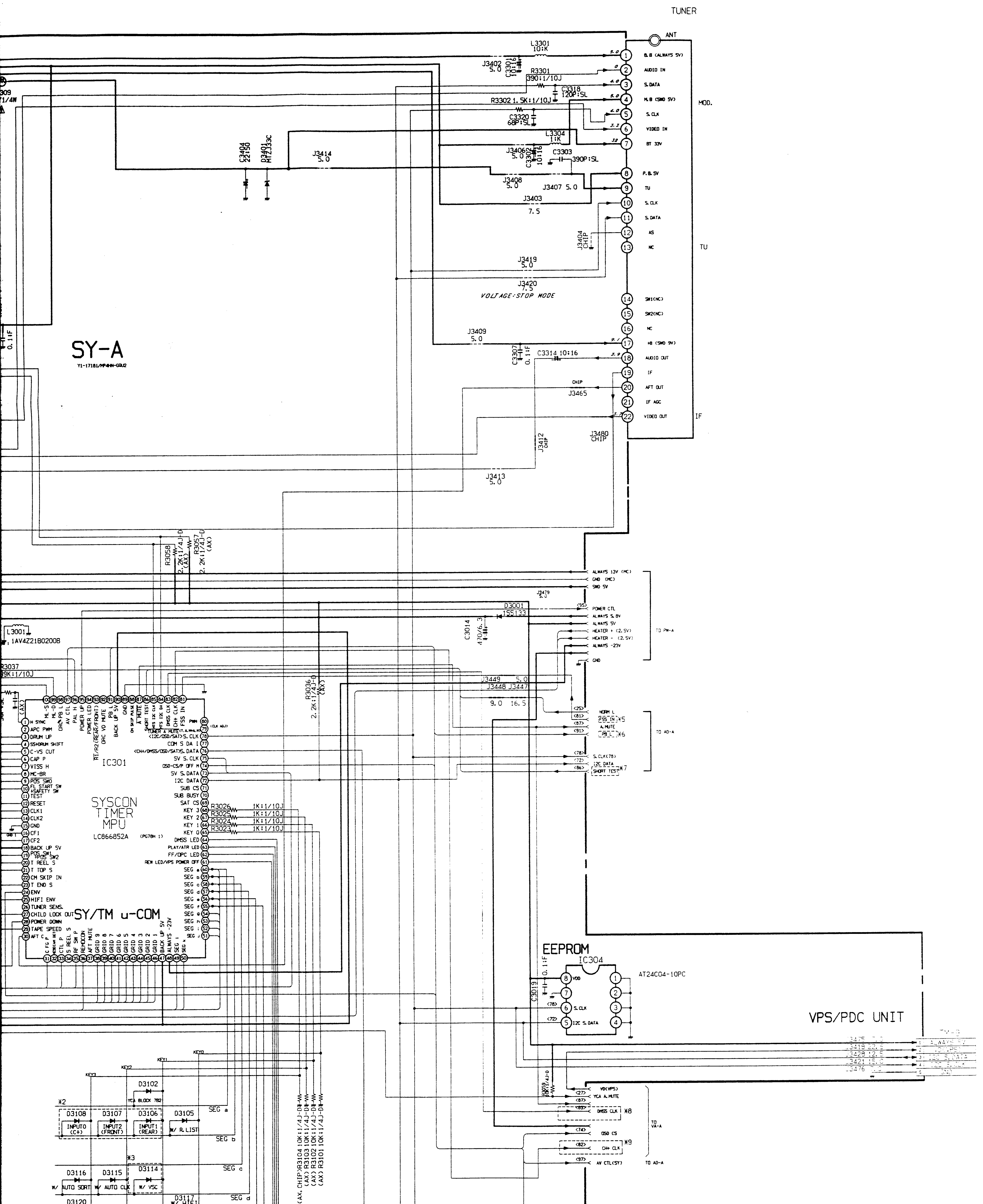

TN-3
U3-17113/MP4HN-G2
CN631
1 S.CLK
2 I2C S.DATA
3 GND
4 SIF IN
5 GND
6 NC
7 NORMAL
8 SWD 5V
9 TU R OUT
10 TU L OUT
11 SWD 9V
TO CP-1(SY-A)
VR631 22K SEPARATION ADJ
VOLTAGE : STOP MODE
SY-A
Y1-17181/MP4HN-G0U2
TO PW-A
ALWAYS 5V
SWD 5V
SWD 9V
ALWAYS 37V
GND
R3309 680/1/4W
TO AD-A
TO VA-A
TUN
ANT
VOLTAGE-STOP MODE
ML DRIVER
IC302 LB1643
RESET
IC303
MN1380L MN1381L
X3002
X3001
8.500MHz
IC301
SYSCON TIMER MPU
LC866852A
SY/TM u-COM
EEPROM
IC304
AT24C04-10P
CN303
T END S
GND
NC
T TOP S
T REEL P
SWD 5V
SAFETY/FL SW
POS SW 1+2
NC
LO MOTOR -
LO MOTOR +
POS SWO
TO MECHANISM CN801
CN301
NC
BACK UP GND
GND
ALWAYS 5V
REMOCON
HEATER +
GRID 9
GRID 8
GRID 7
GRID 6
GRID 5
GRID 4
GRID 3
GRID 2
GRID 1
SEG l
SEG k
SEG j
SEG i
SEG h
SEG g
SEG f
SEG e
SEG d
SEG c
SEG b
SEG a
HEATER -
KEY 2
KEY 1
KEY 0
REW LED
FF LED
PLAY LED
NC
TO TM-1 CN714
D3108 INPUT0 (C4)
D3107 INPUT2 (FRONT)
D3106 INPUT1 (REAR)
D3105 W/ R.LIST
D3102
D3116 W/ AUTO SORT
D3115 W/ AUTO CLK
D3114 W/ VSC
D3117 W/ HIFI
D3120 W/ NAP
D3124 W/ LP
D3122 W/ A.DUB
DIODE OPTION
EEPROM
9
10
11
12
13
14
15
16
17
18
19
20

NOTE NOT USE • OPEN CIRCUIT

VOLTAGE:REC/PLAY MODE

NOTE NOT SPECIFIED DIODE:1SS133

CP-1 BOARD (SY-A) SYSTEM CONTROL,TIMER & TUNER


TUNER
ANT
B.B (ALWAYS 5V)
AUDIO IN
S.DATA
M.B (SMD 5V)
S.CLK
VIDEO IN
BT 33V
P.B.5V
TU
AS
NC
SW1(NC)
SW2(NC)
HB (SMD 9V)
AUDIO OUT
IF
AFT OUT
IF AGC
VIDEO OUT
MOD.
TU
IF
L3301 10:K
J3402 5.0
R3301 390:1/10J
C3318 120P:SL
R3302 1.5K:1/10J
C3320 68P:SL
L3304 1:K
J3406 5.0
C3303 390P:SL
J3414 5.0
C3404 22:50
D3401 MTZ33C
J3408 5.0
J3407 5.0
J3403 7.5
J3404 CHIP
J3419 5.0
J3420 7.5
VOLTAGE:STOP MODE
J3409 5.0
C3307 0.1:F
C3314 10:16
CHIP
J3465
J3412 CHIP
J3480 CHIP
J3413 5.0
SY-A
R3058 2.2K:1/4J-D (AX)
R3057 2.2K:1/4J-D (AX)
ALWAYS 13V (MC)
GND (MC)
SMD 5V
D3001 1SS133
C3014 470/6.3
POWER CTL
ALWAYS 5.8V
ALWAYS 5V
HEATER + (2.5V)
HEATER - (2.5V)
ALWAYS -23V
GND
TO PW-A
L3001
1AV4Z21B0200B
R3037
R3036 2.2K:1/4J-D (AX)
J3449 5.0
J3448 J3447
9.0 16.5
NORM L
A.MUTE
S.CLK(78)
I2C DATA
SHORT TEST
TO AD-A
IC301
SYSCON TIMER MPU
LC866852A
SY/TM u-COM
H SYNC
APC PWM
DRUM UP
SS+DRUM SHIFT
C-VS CUT
CAP P
VISS H
MC-BR
POS SW0
FL START SW +SAFETY SW
TEST
RESET
CLK1
CLK2
GND
CF1
CF2
BACK UP 5V
POS SW1
T REEL S
T TOP S
CM SKIP IN
T END S
ENV
HIFI ENV
TUNER SENS.
CHILD LOCK OUT
POWER DOWN
TAPE SPEED
AFT C
R3026 1K:1/10J
R3025 1K:1/10J
R3024 1K:1/10J
R3023 1K:1/10J
DMSS LED
PLAY/ATR LED
FF/OPC LED
REW LED/VPS POWER OFF
SEG a
SEG b
SEG c
SEG d
SEG e
SEG f
EEPROM
IC304
AT24C04-10PC
C3019 0.1:F
VDD
S.CLK
I2C S.DATA
VPS/PDC UNIT
VD(VPS)
YCA A.MUTE
DMSS CLK
OSD CS
CH+ CLK
AV CTL(SY)
TO VA-A
TO AD-A
ENV DET
C3016 0.018
R3032 (AX) 33K:1/4J-D
S.CLK(78)
S.DATA(76)
I2C DATA
TO VA-A
KEY0
KEY1
KEY2
KEY3
D3102
YCA BLOCK 782
D3108 INPUT0 (C+)
D3107 INPUT2 (FRONT)
D3106 INPUT1 (REAR)
D3105 W/ R.LIST
D3116 W/ AUTO SORT
D3115 W/ AUTO CLK
D3114 W/ VSC
D3117 W/ HIFI
D3120 W/ NAP
D3124 W/ LP
D3122 W/ A.DUB
W/ SHUTTLE REMOCON (SHINAGAWA)
R3104 10K:1/4J-D
R3103 10K:1/4J-D
R3102 10K:1/4J-D
R3101 10K:1/4J-D
DIODE OPTION
VOLTAGE:REC/PLAY MODE
NOTE NOT SPECIFIED DIODE:1SS133
13
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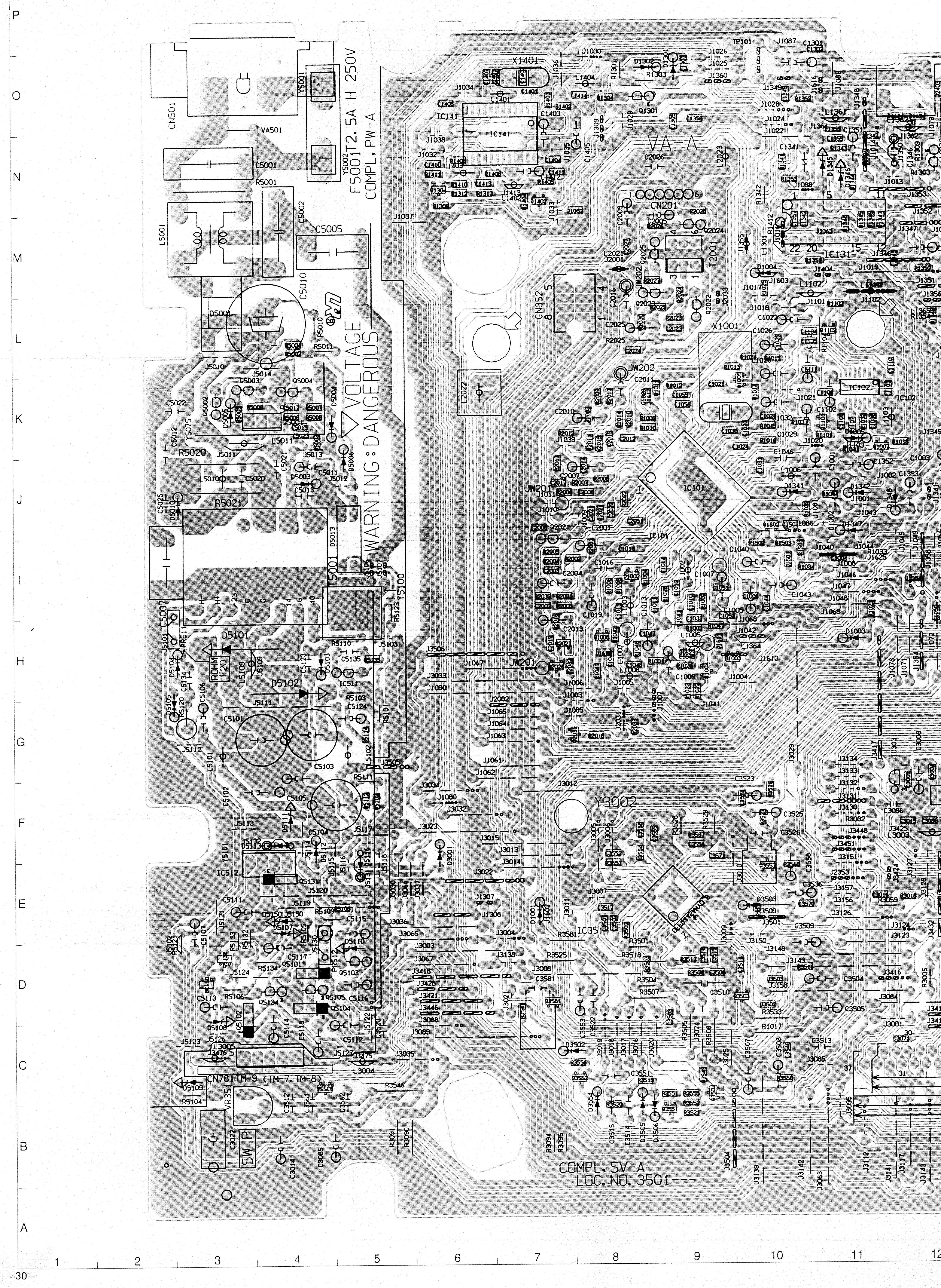
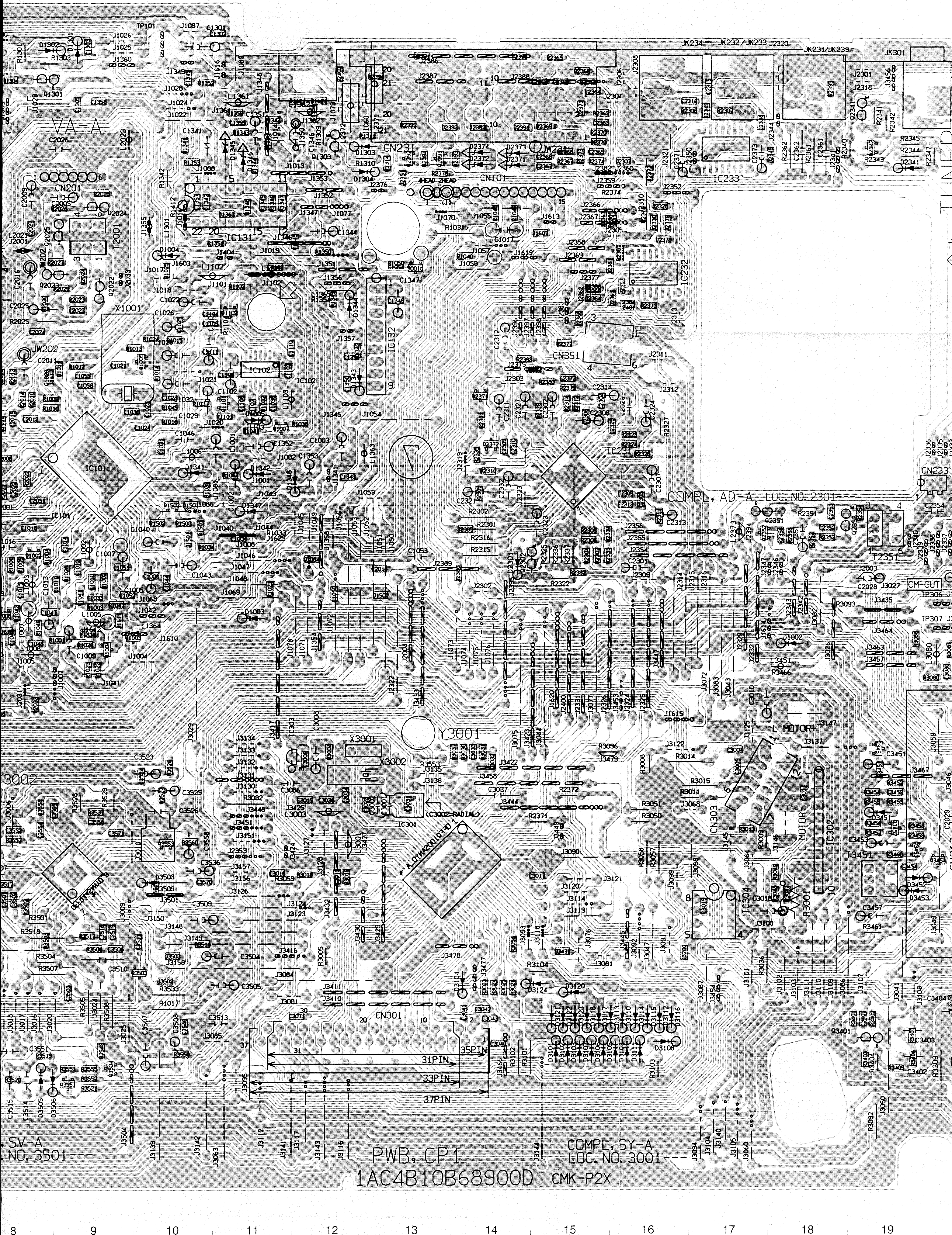
23


F5001 T2.5A H 250V
COMPL. PW-A
WARNING: DANGEROUS VOLTAGE
VA-A
IC101
IC141
IC131
IC351
IC102
IC511
IC512
X1401
X1001
Y3002
CN201
CN352
CN501
CN781 TM-9 (TM-7, TM-8)
T2001
R5021
C5005
L5001
COMPL. SV-A
LOC. NO. 3501---
SW P
P
O
N
M
L
K
J
I
H
G
F
E
D
C
B
A
1
2
3
4
5
6
7
8
9
10
11
12

CP-1 P.W.B.


VA-A
CN201
T2001
X1001
IC101
IC102
IC131
IC132
CN231
CN101
IC232
IC233
CN351
IC231
TUNER
JK234
JK232/JK233
JK231/JK239
JK301
CN233
T2351
COMPL, AD-A, LOC. NO. 2301---
CM-CUT
Y3001
X3001
X3002
(C3002-RADIAL)
IC301
CN303
MOTOR+
MOTOR-
IC302
IC304
T3451
CN301
31PIN
33PIN
35PIN
37PIN
SV-A
.NO. 3501---
COMPL, SY-A
LOC. NO. 3001---
PWB, CP1
1AC4B10B68900D CMK-P2X
8
9
10
11
12
13
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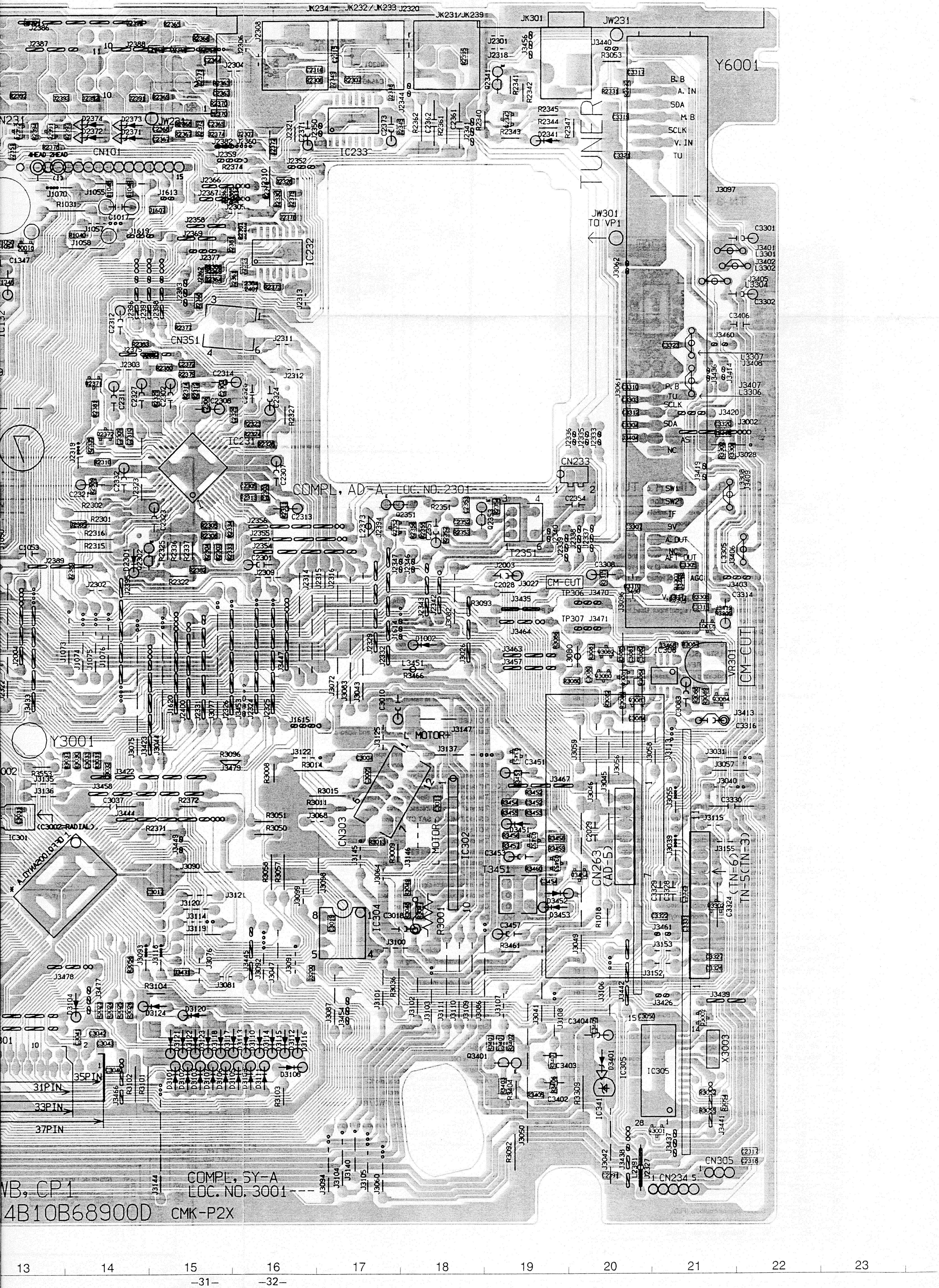
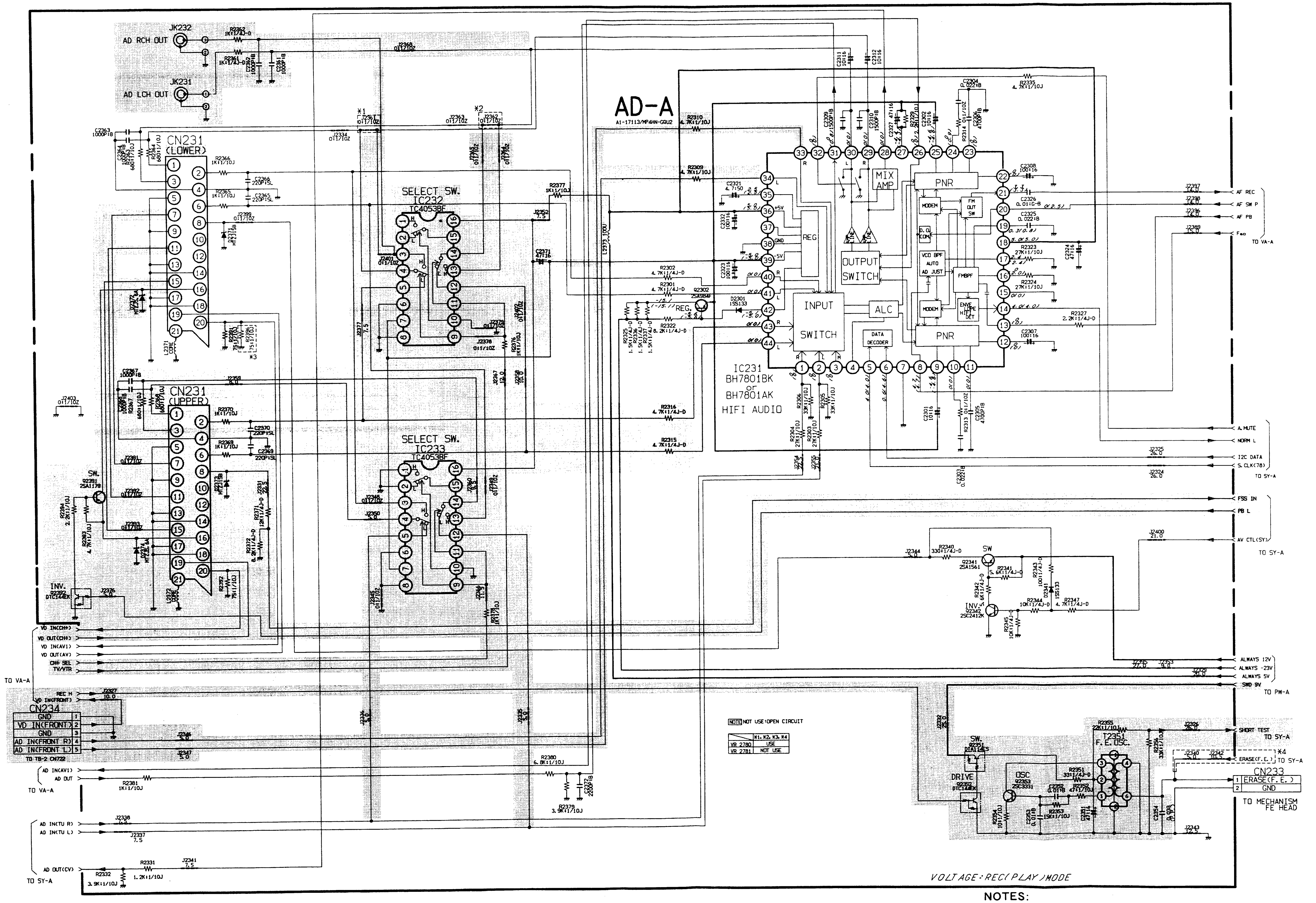
16
17
18
19


JK234
JK232/JK233
J2320
JK231/JK239
JK301
JW231
Y6001
TUNER
B.B
A.IN
SDA
M.B
SCLK
V.IN
TU
JW301
TO VP1
IC233
IC232
IC231
CN351
CN101
4HEAD 2HEAD
CN233
COMPL, AD-A LOC.NO.2301
T2351
P.B
TU
SCLK
SDA
AS
NC
SW1
SW2
IF
9V
A.OUT
NC
AFT OUT
AGC
CM-CUT
VR301
CM-CUT
TP306
TP307
IC306
Y3001
MOTOR+
CN303
MOTOR-
IC302
T3451
CN263 (AD-5)
TN-6
TN-5(TN-3)
IC301
(C3002=RADIAL)
IC304
IC305
IC341
X3003
CN305
CN234
31PIN
33PIN
35PIN
37PIN
PWB, CP1
4B10B68900D
CMK-P2X
COMPL, SY-A
LOC. NO. 3001
13
14
15
16
17
18
19
20
21
22
23

CP-1 BOARD (AD-A) HiFi AUDIO


AD-A
A1-17113/MP4HN-G0U2
JK232
AD RCH OUT
JK231
AD LCH OUT
CN231 (LOWER)
CN231 (UPPER)
SELECT SW. IC232 TC4053BF
SELECT SW. IC233 TC4053BF
IC231 BH7801BK or BH7801AK HIFI AUDIO
INPUT SWITCH
OUTPUT SWITCH
MIX AMP
PNR
REG
ALC
DATA DECODER
MODEM
FM OUT SW
VCO BPF AUTO AD JUST
FMBPF
ENVE LOPE DET
REG.
SW.
INV.
SW
INV.
DRIVE
OSC
T2351 F.E. OSC.
CN234
GND
VD IN(FRONT)
GND
AD IN(FRONT R)
AD IN(FRONT L)
TO TB-2 CN722
VD IN(CH#)
VD OUT(CH#)
VD IN(AV1)
VD OUT(AV)
CH# SEL
TV/VTR
TO VA-A
REC H
VD IN(FRONT)
AD IN(AV1)
AD OUT
TO VA-A
AD IN(TU R)
AD IN(TU L)
AD OUT(CV)
TO SY-A
AF REC
AF SW P
AF PB
Fsc
TO VA-A
A.MUTE
NORM L
I2C DATA
S.CLK(78)
TO SY-A
FSS IN
PB L
AV CTL(SY)
TO SY-A
ALWAYS 12V
ALWAYS -23V
ALWAYS 5V
SWD 9V
TO PW-A
SHORT TEST
TO SY-A
ERASE(F.E.)
TO SY-A
CN233
ERASE(F.E.)
GND
TO MECHANISM FE HEAD
NOTE NOT USE:OPEN CIRCUIT
※1, ※2, ※3, ※4
VR 2780 USE
VR 2781 NOT USE
VOLTAGE: REC(PLAY)MODE
K
J
I
H
G
F
E
D
C
B
A
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15

NOTES:

——— : Common parts for VR 2780 & VR 2781.

The parts marked ▨ are VR2781 ONLY.

K

J

I

H

G

F

E

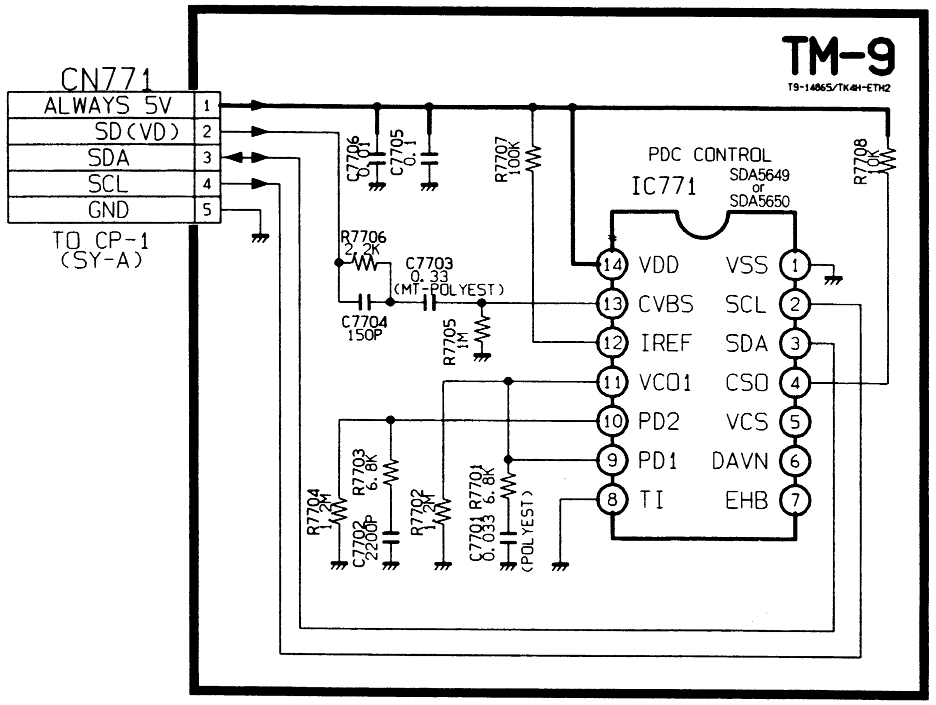
D

C

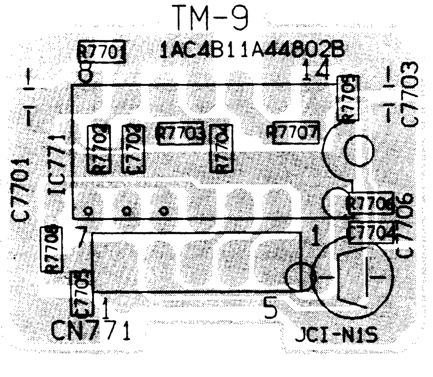
B

A

TM-9 BOARD PDC/VPS


TM-9
T9-1486S/TK4H-ETH2
CN771
ALWAYS 5V 1
SD(VD) 2
SDA 3
SCL 4
GND 5
TO CP-1
(SY-A)
C7706 0.01
C7705 0.1
R7707 100K
PDC CONTROL
IC771
SDA5649 or SDA5650
R7708 10K
R7706 2.2K
C7703 0.33 (MT-POLYEST)
C7704 150P
R7705 1M
14 VDD
13 CVBS
12 IREF
11 VCO1
10 PD2
9 PD1
8 TI
VSS 1
SCL 2
SDA 3
CSO 4
VCS 5
DAVN 6
EHB 7
R7704 1.2M
C7702 2200P
R7703 6.8K
R7702 1.2M
C7701 0.033 (POLYEST)
R7701 6.8K

TM-9 P.W.B.


TM-9
1AC4B11A44802B
R7701
8
14
R7705
C7703
C7701
IC771
R7702
R7704
R7703
R7706
R7707
R7708
C7706
C7704
7
1
C7705
CN771
1
5
JCI-N1S

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15

V22163

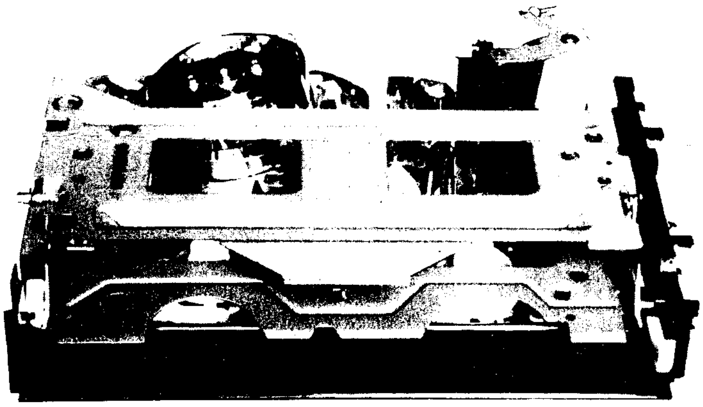
BASIC SERVICE TECHNICAL INFORMATION

universum.

Video Cassette Recorder

V95 II MECHANISM

(VR 2775)
(VR 2780)
(VR 2781)



VHS
PAL SECAM NTSC

Contents

1. MAINTAINING AND CHECKING THE MECHANISM

1-1. REGULAR CHECKS AND MAINTENANCE ITEMS 2
1-2. SERVICE TOOLS 3

2. AN OVERVIEW OF THE MECHANISM

2-1. NAMES OF THE MAIN PARTS 4
2-2. AN OVERVIEW OF THE MECHANISM MODES 6

3. DIS-ASSEMBLING THE MAIN PARTS OF THE MECHANISM

3-1. HOW TO MAKE THE MECHANISM MOVE 8
3-2. MECHANISM UNIT 9
3-3. CASSETTE DRIVE MECHANISM .. 9
3-4. CLEANER ROLLER ASSEMBLY 11
3-5. CYLINDER (DRUM) 12
3-6. FE HEAD AND ACE HEAD 14
3-7. CAPSTAN MOTOR 15
3-8. LOADING MOTOR ASSEMBLY AND WORM GEAR ASSEMBLY . 16
3-9. PINCH ROLLER PRESSURE MECHANISM 16
3-10. L GUIDE LEVER ASSEMBLY AND LOAD LEVER ASSEMBLY 18
3-11. BT LEVER ASSEMBLY 18
3-12. REEL DRIVE MECHANISM 19
3-13. BRAKES 20
3-14. GUIDES 22
3-15. WHEEL GEAR 2, MAIN CAM AND MODE SWITCH 23
3-16. CRESCENT SLIDE 24
3-17. S LOAD GEAR, T LOAD GEAR, S LOAD LEVER ASSEMBLY AND T LOAD LEVER ASSEMBLY 25
3-18. TAPE SENSORS, REEL SENSOR AND EP SW LEVER 26

4. MECHANISM CHECKS AND ADJUSTMENTS

4-1. REEL TABLE TORQUE CHECK 27
4-2. ADJUSTING THE BT LEVER ASSEMBLY POSITION AND CHECKING THE BACK TENSION TORQUE IN PLAY MODE 27
4-3. TAPE PATH ADJUSTMENT 28

REFERENCE No.MM531616

1. MAINTAINING AND CHECKING THE MECHANISM

1-1. REGULAR CHECKS AND MAINTENANCE ITEMS

To obtain full function and maximum performance from the set, and to stop it getting dirty or scratched, we recommend that you carry out the following maintenance procedures and regular checks. The maintenance checks described in the following section should also be carried out without fail after carrying out any repairs to the set.

NOTE: OIL AND GREASE

- Always use the specified brands of oil and grease. If you use a grease with the wrong viscosity, for example, this can lead to all sorts of problems. Be careful to keep the oil and grease free of dust and foreign bodies.
- A "drop" of oil is the amount of oil remaining on the tip of a rod with a diameter of 1.5mm after it is dipped in oil to a depth of 1cm and then taken out.

1-1-1. REGULAR CHECKS

○Clean ◎Check △Oil

Part maintained	Hours of use (H)	500	1000	1500	2000	2500	3000	3500	4000	4500	5000	Remarks
Tape path system	Tape guide	○	○	○	○	○	○	○	○	○	○	
	ACE head, full erase head	○	○	○	○	○	○	○	○	○	○	
	Cylinder (drum)	○	○ (◎)	○ (◎)	○ (◎)	○ (◎)	○ (◎)	○ (◎)	○ (◎)	○ (◎)	○ (◎)	The life of parts varies enormously, depending on the environment in which the part is used.
	Cleaner roller assembly		◎		◎		◎		◎		◎	
	Pinch roller	○	○	○	○	○	○	○	○	○	○	
Drive system	Reel table		○		○△		○		○△		○	
	Reel belt	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	
	Relay gear, Pulley shaft, Gear shaft		△		△		△		△		△	
	Loading motor		◎		◎		◎		◎		◎	
Performance checks	Back tension		◎		◎		◎		◎		◎	Playback tension torque: 30 to 50g/cm
	Brake system		◎		◎		◎		◎		◎	
	FWD, REW, PLAY torque, REV torque		◎		◎		◎		◎		◎	FWD: 600g/cm or over REW: 600g/cm or over PLAY (SP mode): 80 to 140g/cm REV: 120 to 220g/cm

1-1-2. CLEANING

1. Cylinder (Drum) (See Fig.1-1-1)

Moisten a chamois with methyl alcohol and clean the video head (including the Hi-Fi audio head) and the tape path surface of the cylinder. Be sure to wipe horizontally in relation to the video head. If you wipe vertically, or use excessive force, you can damage the video head.

2. Tape Path System / Reel Drive System

Clean the pinch roller, the capstan shaft, the tape guides, the FE head, the ACE head, the reel table, the pulley and the reel belt with a soft cloth, or chamois, moistened with methyl alcohol.

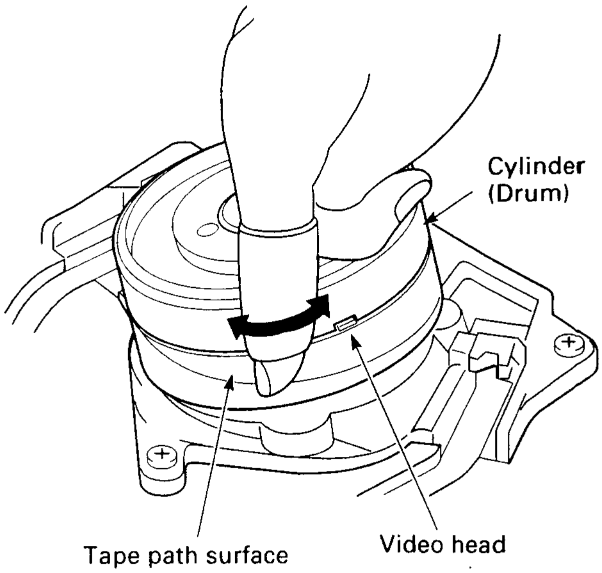


Fig.1-1-1

1-2. SERVICE TOOLS

1-2-1. SERVICE TOOLS
NOTES ON ALIGNMENT TAPES

Select a PAL or NTSC alignment tape from the list below, according to the transmission system of the VCR you are repairing.

PAL: For models with 625 scanning lines and a field frequency of 50Hz

NTSC: For models with 525 scanning lines and a field frequency of 60Hz

No.	Tool	Tool No.		Remarks
		NTSC	PAL	
1	Alignment tape	VHJ-0005	VHJ-0008	SP colour bar 1kHz (normal)
2	Alignment tape	VHJ-0006	VHJ-0009	SP monoscope 7kHz (normal)
3	Alignment tape	VHJ-0007	———	EP monoscope
4	Alignment tape	———	VHJ-0052	LP monoscope
5	Eccentric screw driver	VHJ-0003		Used to adjust the tape path
6	Nut box	VHJ-0048		Used to adjust the height of the lever load assembly
7	Torque dial gauge	VHJ-0004		Used to measure reel winding torque
8	Cassette torque meter	VHJ-0016		Used to measure back tension torque
9	Load lever assembly height adjustment tool	VHJ-0102		Used to adjust the height of the load lever assembly
10	Torque gauge screwdriver	VHJ-0014		Used to adjust the tightening torque of screws
11	3 mm dia. bit for torque screwdriver	VHJ-0045		Used to replace the bit of the torque gauge screwdriver
12	Video head removing tool	VHJ-0041		Used to remove the upper cylinder
13	Oil	VHJ-0099		
14	Grease	VHJ-0100		
15	Grease	VHJ-0101		
16	Relay cables	VHJ-0106		Relay cables of mechanism and CP-1 PWB assembly

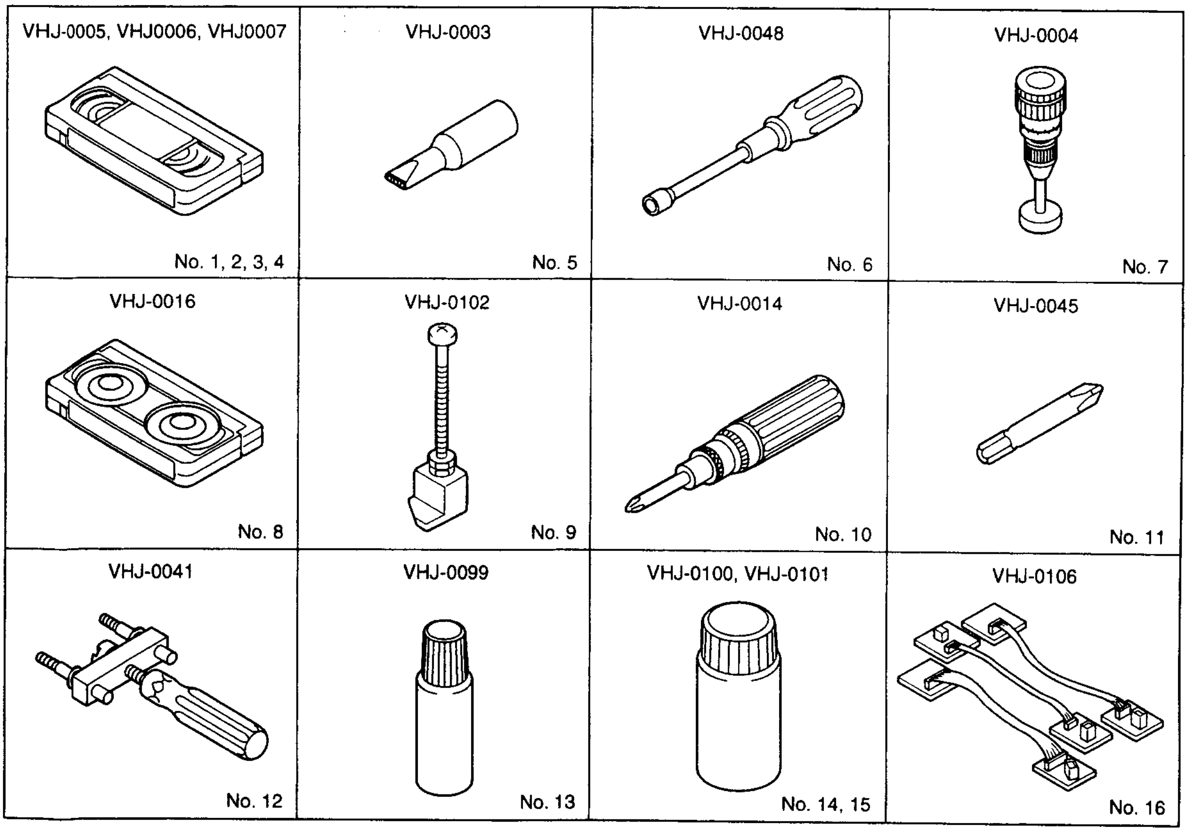

VHJ-0005, VHJ0006, VHJ0007
No. 1, 2, 3, 4
VHJ-0003
No. 5
VHJ-0048
No. 6
VHJ-0004
No. 7
VHJ-0016
No. 8
VHJ-0102
No. 9
VHJ-0014
No. 10
VHJ-0045
No. 11
VHJ-0041
No. 12
VHJ-0099
No. 13
VHJ-0100, VHJ-0101
No. 14, 15
VHJ-0106
No. 16

Fig.1-2-1

1-2-2. Using the Relay Cable (VHJ-0106)

The mechanism can be repaired without using the relay cable (VHJ-0106). As shown in Fig. 1-2-2, the relay cable (VHJ-0106) is a tool used for relay between the CP-1 PWB assembly and mechanism unit.
When connecting it, take note of the pin number of the connector.

NOTE 1: Do not place the mechanism upright as shown in Fig. 1-2-2 when inserting/ejecting the cassette.
NOTE 2: For NTSC models, be sure to connect the VM-1 PWB assembly and CP-1 PWB assembly.

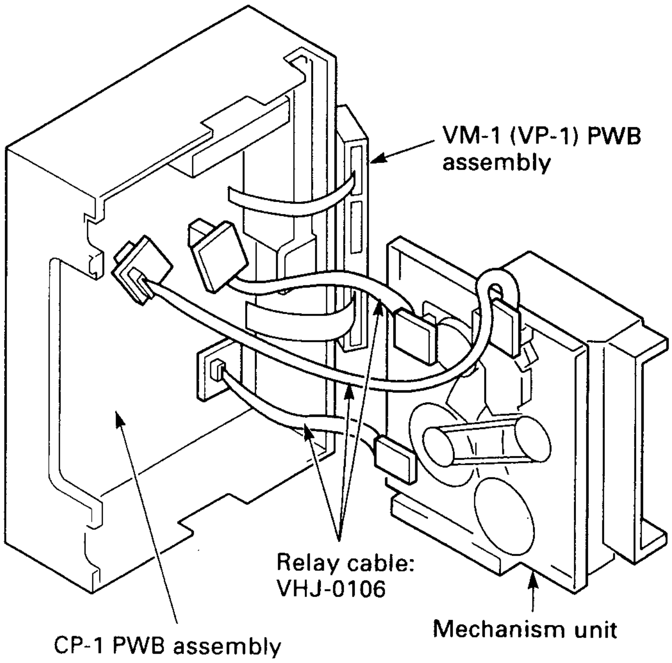

VM-1 (VP-1) PWB assembly
Relay cable: VHJ-0106
Mechanism unit
CP-1 PWB assembly

Fig. 1-2-2

2. AN OVERVIEW OF THE MECHANISM

2-1. NAMES OF THE MAIN PARTS

2-1-1. CASSETTE MECHANISM ASSEMBLY

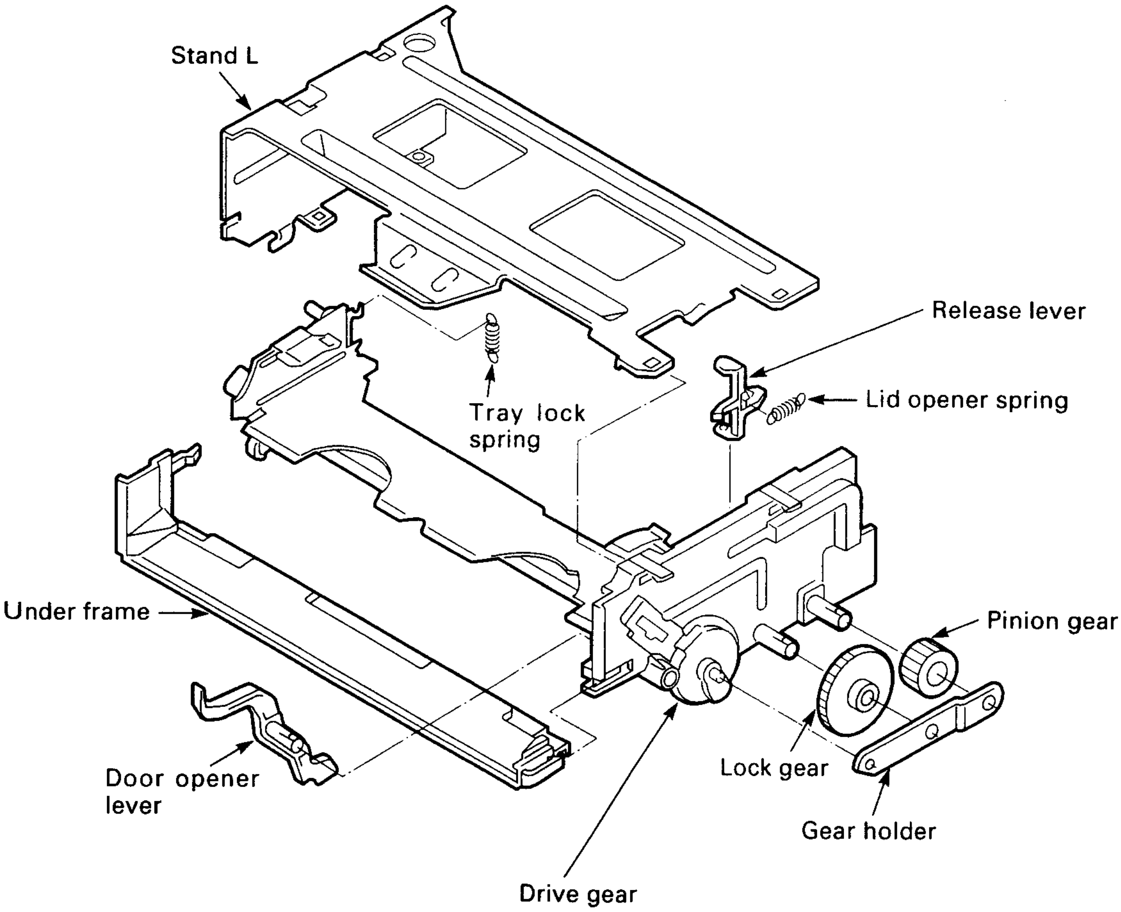

Stand L
Release lever
Tray lock spring
Lid opener spring
Under frame
Pinion gear
Door opener lever
Lock gear
Gear holder
Drive gear

Fig. 2-1-1

2-1-2. TOPVIEW

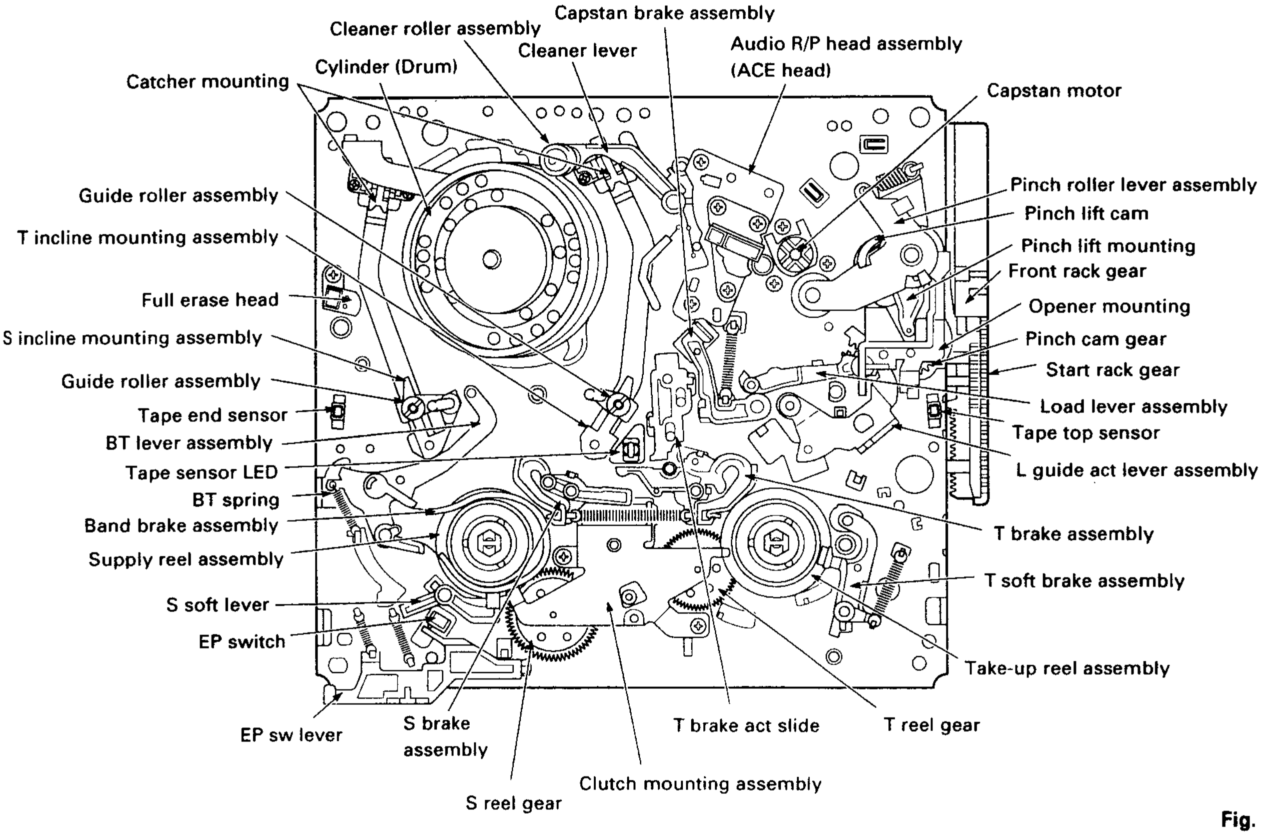

Capstan brake assembly
Cleaner roller assembly
Cleaner lever
Audio R/P head assembly (ACE head)
Cylinder (Drum)
Catcher mounting
Capstan motor
Guide roller assembly
Pinch roller lever assembly
Pinch lift cam
T incline mounting assembly
Pinch lift mounting
Front rack gear
Full erase head
Opener mounting
S incline mounting assembly
Pinch cam gear
Start rack gear
Guide roller assembly
Load lever assembly
Tape end sensor
Tape top sensor
BT lever assembly
L guide act lever assembly
Tape sensor LED
BT spring
T brake assembly
Band brake assembly
Supply reel assembly
T soft brake assembly
S soft lever
EP switch
Take-up reel assembly
EP sw lever
S brake assembly
T brake act slide
T reel gear
Clutch mounting assembly
S reel gear

Fig. 2-1-2

2-1-3. UNDERSIDE

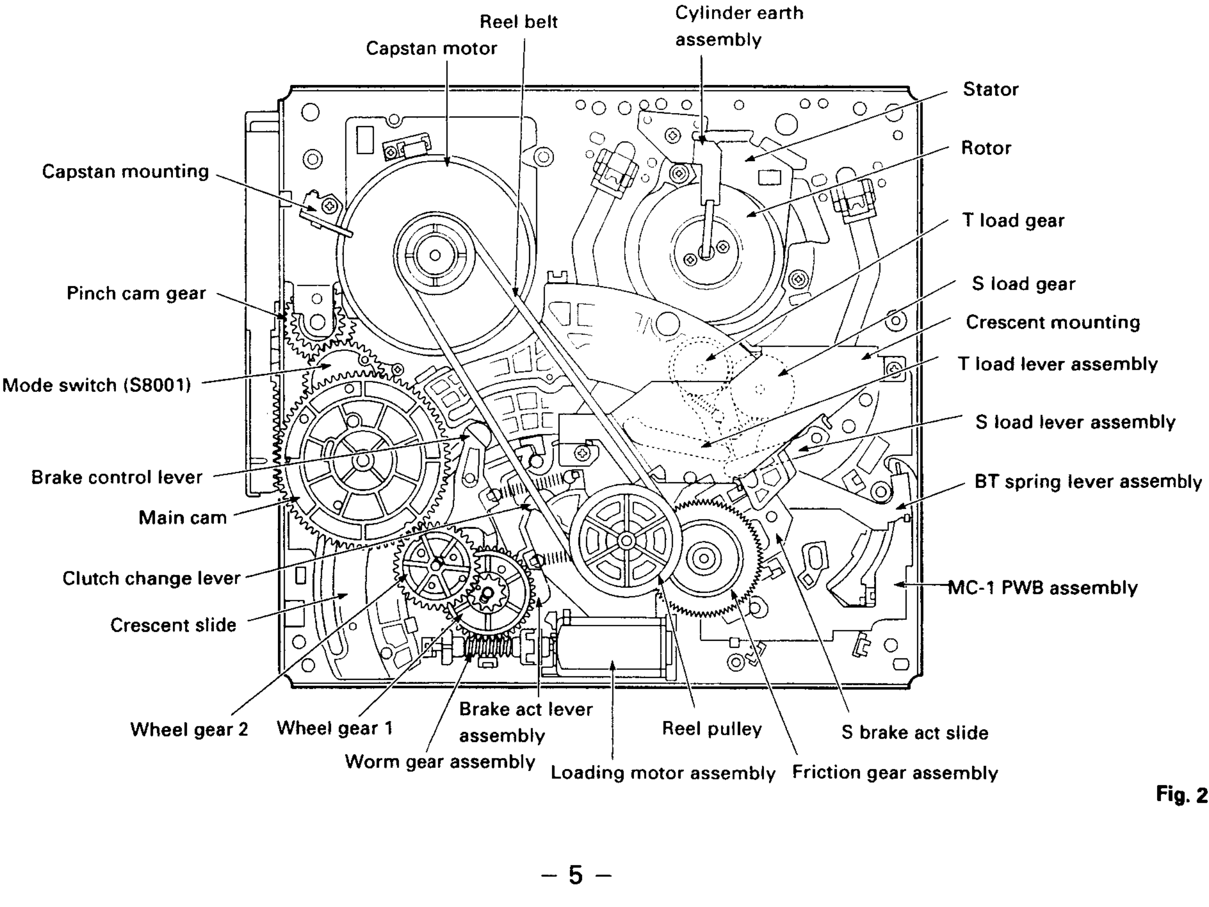
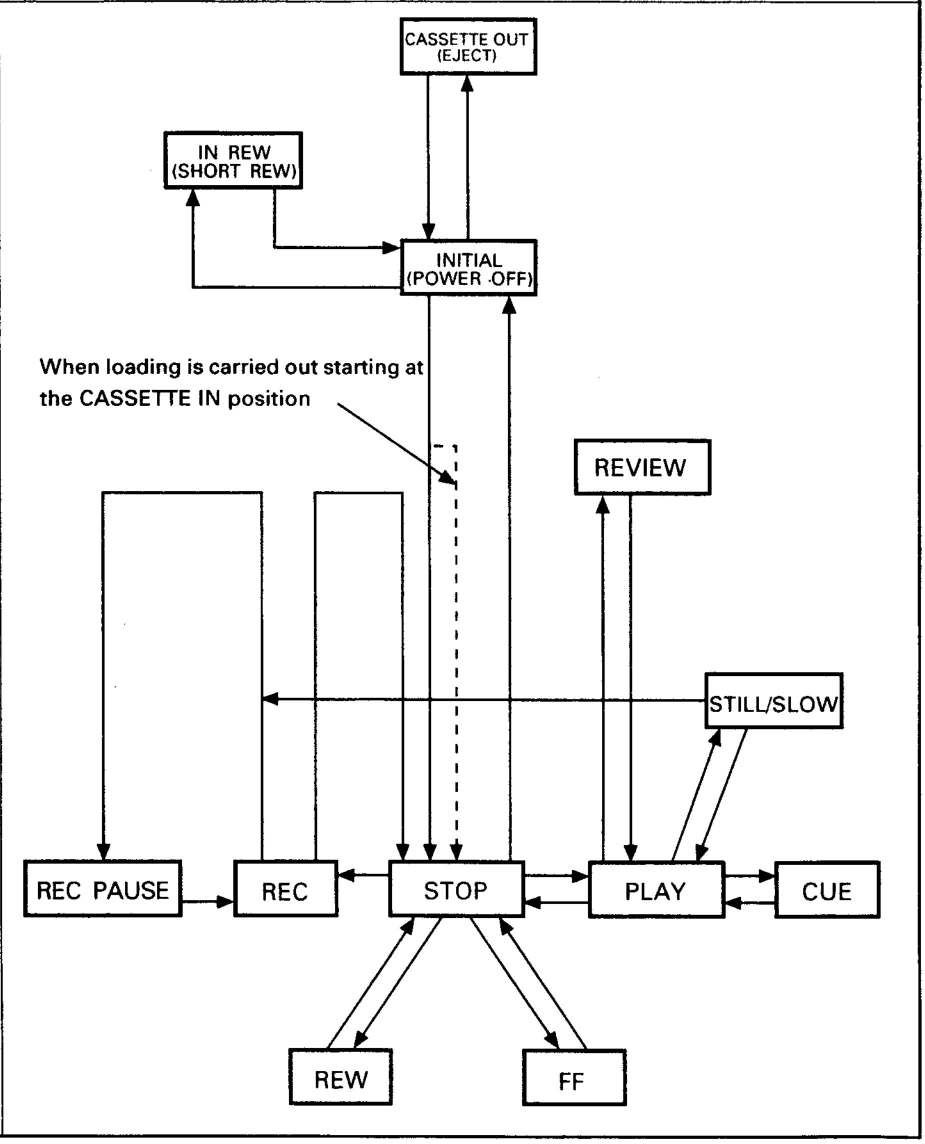

Reel belt
Cylinder earth assembly
Capstan motor
Stator
Capstan mounting
Rotor
T load gear
Pinch cam gear
S load gear
Crescent mounting
T load lever assembly
Mode switch (S8001)
S load lever assembly
Brake control lever
BT spring lever assembly
Main cam
Clutch change lever
MC-1 PWB assembly
Crescent slide
Wheel gear 2
Wheel gear 1
Brake act lever assembly
Reel pulley
S brake act slide
Worm gear assembly
Loading motor assembly
Friction gear assembly

Fig. 2-1-3

2-2. AN OVERVIEW OF THE MECHANISM MODES

2-2-1. MECHANISM MODE SWITCHING TABLE

NOTE: The letters and figures enclosed in circles in the mechanism mode column are the codes on the crescent slide.

HEX DATA	Mechanism mode	The principal mode-switching states of the mechanism
6	EJECT Ⓔ Distinguished by whether the EP switch is ON or OFF. Horizontal shift section. Vertical shift section.	
2	IN REW Ⓡ	
0		
7	INITIAL ⑦	
0	Cleaner roller assembly: ON	
1	S/T mounting incline assembly pressure begins.	
0	S/T mounting incline assembly pressure ends.	
1	REVIEW ①	
0	IDLER pos. ②	
2	(Pinch roller OFF)	
0		
3	STILL/SLOW ③	
0		
5	PLAY/STOP ⑤	
0		
4	BRAKE pos. ④	
0		
6	FF/REW ⑥	

CASSETTE OUT (EJECT)
IN REW (SHORT REW)
INITIAL (POWER OFF)
When loading is carried out starting at the CASSETTE IN position
REVIEW
STILL/SLOW
REC PAUSE
REC
STOP
PLAY
CUE
REW
FF

MODE SWITCH OUTPUT TABLE

HEX DATA	SW DATA			SW DATA 2	
	1	X	Y	Z	
0	5.0V	H	H	H	5V
1	5.0V	H	H	L	0V
2	2.5V	H	L	H	5V
3	2.5V	H	L	L	0V
4	3.4V	L	H	H	5V
5	3.4V	L	H	L	0V
6	2.0V	L	L	H	5V
7	2.0V	L	L	L	0V

APPEARANCE OF MODE SWITCH AND RELATIONSHIP BETWEEN MODE POSITIONS

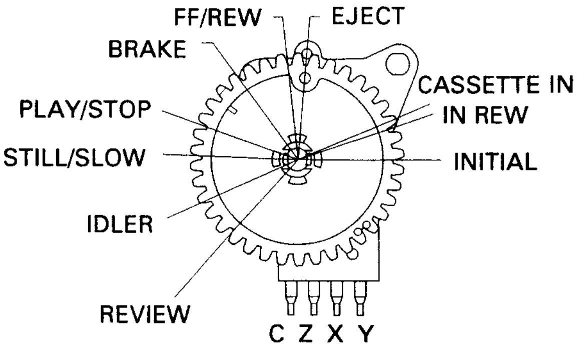

FF/REW
EJECT
BRAKE
CASSETTE IN
IN REW
PLAY/STOP
STILL/SLOW
INITIAL
IDLER
REVIEW
C Z X Y

Fig.2-2-1

2-2-2. MOVEMENT CHECK LIST FOR THE MAIN PARTS OF THE MECHANISM

(S): Strength (W): Weakness

Principal parts \ Mechanism mode	EJECT	IN REW	INITIAL (POWER OFF)	(LOADING)	(UNLOADING)	REV	IDLER	STILL/SLOW	PLAY/STOP	BRAKE	FF/REW	
T brake assembly	OFF	OFF	ON	ON	ON	OFF	OFF	OFF	OFF	ON	ON/OFF	
S brake assembly	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	ON	ON/OFF	
T soft brake assembly	OFF	OFF	OFF	ON	ON	ON	ON	OFF	OFF	OFF	OFF	
S soft lever	ON	ON	ON	ON	ON	OFF	OFF	OFF	OFF	OFF	OFF	
BT lever assembly	OFF	OFF	OFF	OFF	OFF	ON	ON	ON	ON	ON	ON	
BT spring	OFF	OFF	OFF	OFF	OFF	ON(W)	ON(W)	ON(S)	ON(S)	ON(S)	ON(W)	
Pinch roller lever assembly	UP	UP	UP	UP/ DOWN	DOWN/ UP	ON	OFF	ON	ON	OFF	OFF	
Clutch mounting assembly	PLAY	PLAY	PLAY	PLAY	PLAY	PLAY	PLAY	PLAY	PLAY	PLAY	FF	
Load lever assembly	UNLO	UNLO	UNLO	LO	LO	LO	LO	LO	LO	LO	LO	
Capstan brake assembly	OFF	OFF	OFF	OFF	OFF	OFF	OFF	ON	OFF	OFF	OFF	
S and T incline mounting assembly				LO	UNLO							
Cleaner roller assembly	OFF	OFF	OFF	(ON)	(ON)	OFF	OFF	OFF	OFF	OFF	OFF	

2-2-3. HOW TO CHECK THE MECHANISM MODE POSITION

You can tell which mode the mechanism is currently in by looking at the codes and marking-lines on the crescent slide on the underside of the mechanism chassis. The edge of the crescent mounting is used as the reference line, as shown in Fig.2-2-2, and the marking-lines and symbols indicating the mechanism modes are displayed on the crescent slide, which slides against the edge of the crescent mounting. The mechanism mode is read off from the marking-line on the slide crescent which is aligned with the reference-line on the crescent mounting.
Example: In Fig.2-2-2, marking-line 6 is aligned with the reference-line on the crescent mounting , so the mechanism is seen to be in FF/REW mode.

2-2-4. SELF-DIAGNOSIS DISPLAY

Some models are equipped with the SELF-DIAGNOSIS DISPLAYS function.
Use it as a means of finding out the symptoms and cause of the error before performing repairs.
For details, refer to the separate service manual for the respective models.

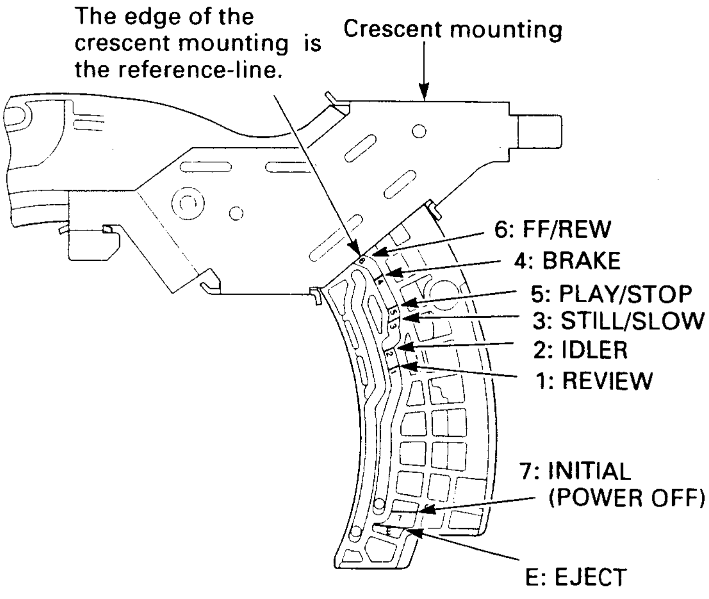


Fig.2-2-2

3. DISASSEMBLING THE MAIN PARTS OF THE MECHANISM

POINTS TO NOTE

- When fitting the parts of the mechanism, refer to the "Assembly Notes", and proceed in the reverse of disassembly order.
- Dis-assembly and assembly should be carried out in EJECT mode unless a movement mode is explicitly specified. EJECT mode is the state in which the cassette tape has been ejected.
- Clamps are used to prevent parts coming loose. When removing a clamp, be careful not to force it, as this can result in damage.

3-1. HOW TO MAKE THE MECHANISM MOVE

In order to check a movement such as front loading, front unloading, tape loading, tape unloading, raising/lowering and pressing the pinch roller, you will need to operate the loading motor. There are two methods of operating the loading motor, and these are explained in sections 3-1-1 and 3-1-2. The above movements can also be performed without operating the loading motor, by following the method explained in section 3-1-3.

3-1-1. HOW TO OPERATE THE LOADING MOTOR USING A DC VOLTAGE SUPPLY (See Fig.3-1-1)

1) Remove the power plug from the socket.
2) Remove the top cover, front cabinet assembly and bottom cover.
3) Supply a DC voltage in the range 5V between the MOTOR (+) wire and the MOTOR (–) wire on the CP-1 PWB assembly. To make the loading motor rotate in the PLAY or FF/REW direction, the positive terminal should be connected to the MOTOR (+) wire, and the negative terminal to the MOTOR (–) wire. To make it rotate in the EJECT direction, connect the positive terminal to the MOTOR (–) wire, and the negative terminal to the MOTOR (+) wire.
   When rotating the loading motor in the EJECT direction with a tape slacken, stop the rotation of the loading motor before beginning front unloading.
   Rotate the capstan motor with your hand, wind the slacked part of the tape, and rotate the loading motor in the EJECT direction again.

NOTE 1: When carrying out front loading, release the lock by pressing down the tray lock lever ⑧ and the lid opener lever ⑨ of the cassette mechanism assembly (shown in Fig.3-2-2) in the direction of the arrow.

NOTE 2: When the loading motor stops rotating, following the completion of an operation such as tape loading or front unloading, switch off the DC voltage supply.

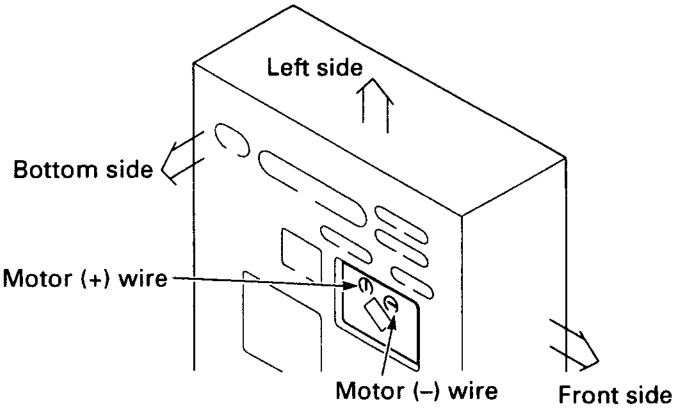


Fig.3-1-1

3-1-2. OPERATING THE LOADING MOTOR BY THE MANUAL METHOD (See Fig.3-1-2)

1) Refer to section 3-2 and install the mechanism unit.
2) Using your finger, turn the loading motor located at the rear of the mechanism unit. For EJECT, turn the loading motor in the direction of the arrow on the loading motor. For PLAY or FF/REW, turn it in the opposite direction.
   When rotating the loading motor in the EJECT direction with a tape slacken, stop the rotation of the loading motor before beginning front unloading.
   Rotate the capstan motor with your hand, wind the slacked part of the tape, and rotate the loading motor in the EJECT direction again.
   When carrying out front loading, release the lock by pressing down the tray lock lever ⑧ and the lid opener lever ⑨ of the cassette mechanism assembly (shown in Fig.3-2-2).

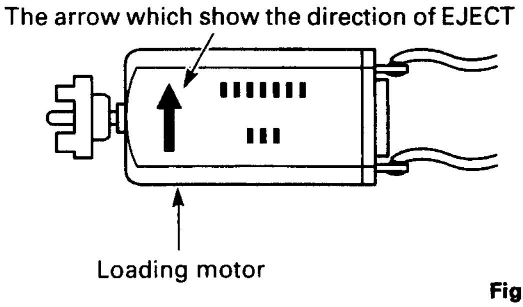


Fig.3-1-2

3-1-3. MAKING THE MECHANISM MOVE USING THE MANUAL METHOD

1) Refer to section 3-2 and remove the mechanism unit.
2) Refer to section 3-15 and remove the gear wheel 2.
3) If you turn the main cam anticlockwise, the mechanism will switch to a mode such as PLAY or FF/REW. To switch from FF/REW mode to EJECT mode, turn the main cam clockwise.

3-2. MECHANISM UNIT (See Figs. 3-2-1 and 3-2-2)

1) Remove the top cover, bottom cover and front cabinet assembly.
2) Unplug the flat cable ① from the VM-1/VP-1 PWB assembly on the cylinder (drum), and unplug the ACE head connector ③.
3) Remove the screw ②, the two screws ④, then remove the VM-1/VP-1 PWB assembly ⑤, lifting it upwards. The shape of the VM-1/VP-1 PWB assembly and the bracket varies according to the model.
4) Remove the four screws ⑥ and the two screws ⑩, then lift up the mechanism unit. The tray ⑦ will stop you removing the two screws ⑥ on the front, so release the lock by pressing down the tray lock lever ⑧ and the lid opener lever ⑨ shown in Fig.3-2-2, then slide off the tray ⑦. Move the tray by referring to section 3-1 and turn the loading motor in the PLAY direction.

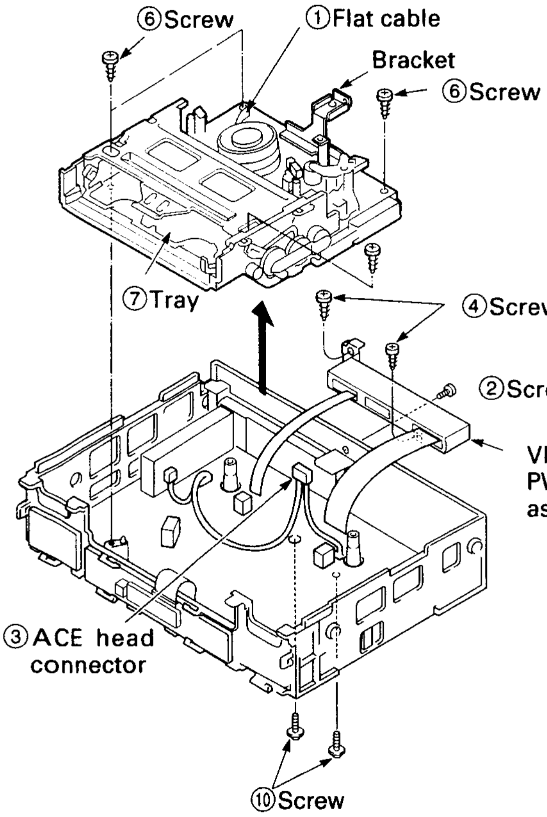

⑥Screw
①Flat cable
Bracket
⑥Screw
⑦Tray
④Screw
②Screw
VM-1(VP-1) PWB assembly
③ACE head connector
⑩Screw

Fig.3-2-1

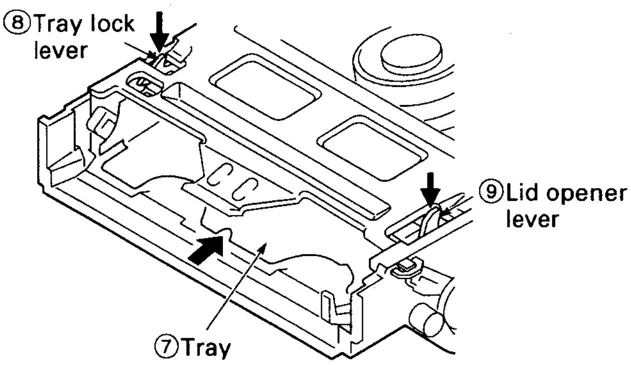

⑧Tray lock lever
⑨Lid opener lever
⑦Tray

Fig.3-2-2

3-3. CASSETTE DRIVE MECHANISM

3-3-1. CASSETTE MECHANISM ASSEMBLY (See Figs.3-3-1 and 3-3-2)

1) Put the VCR into EJECT mode.
2) Remove the two screws ①.
3) Lift up the back of the cassette mechanism assembly ② slightly, and remove the two hooks ③ on the front.

ASSEMBLY NOTES:

1. The cassette mechanism assembly and the mechanism chassis should both be fitted in EJECT mode.
2. Check that the two hooks ③ have snapped into the mechanism chassis, and make sure that the two holes ④ in the cassette mechanism assembly are aligned with the two dowels ⑤ on the mechanism chassis.
3. Make sure that the big tooth on the pinion gear of the cassette mechanism assembly slots properly into the deepest gap in the start rack gear, as shown in Fig.3-3-2.
4. When fitting the two screws ①, use the torque gauge screwdriver (VHJ-0014). Give the screws a tightening torque of 5 kg/cm.

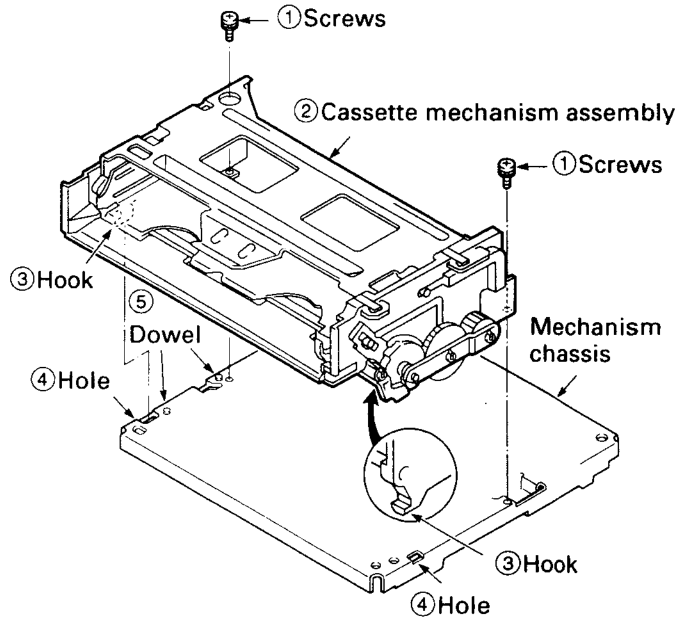

①Screws
②Cassette mechanism assembly
①Screws
③Hook
⑤ Dowel
④Hole
Mechanism chassis
③Hook
④Hole

Fig.3-3-1

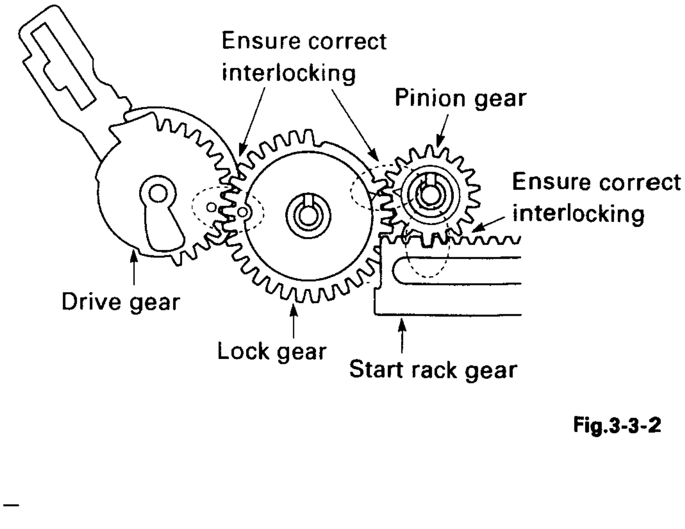

Ensure correct interlocking
Pinion gear
Ensure correct interlocking
Drive gear
Lock gear
Start rack gear

Fig.3-3-2

3-3-2. CASSETTE DRIVE GEAR (See Fig.3-3-3)

1) Refer to section 3-3-1 and remove the cassette mechanism assembly.
2) Remove clamps ① and ②, then remove the gear holder ③.
3) Remove the clamp ①, then remove the pinion gear ④.
4) Remove the clamp ②, then remove the lock gear ⑤.

ASSEMBLY NOTES:

1. Put the tray in the EJECT mode position before fitting any parts.
2. Apply grease (VHJ-0100) to the gear mounting shafts, all the gear teeth, and the cam part of the drive gear ⑥.
3. Ensure that the drive gear, the lock gear and the pinion gear interlock correctly, as shown in Fig.3-3-2.
4. Make sure the clamps ① and ② snap in to the gear holder ③.

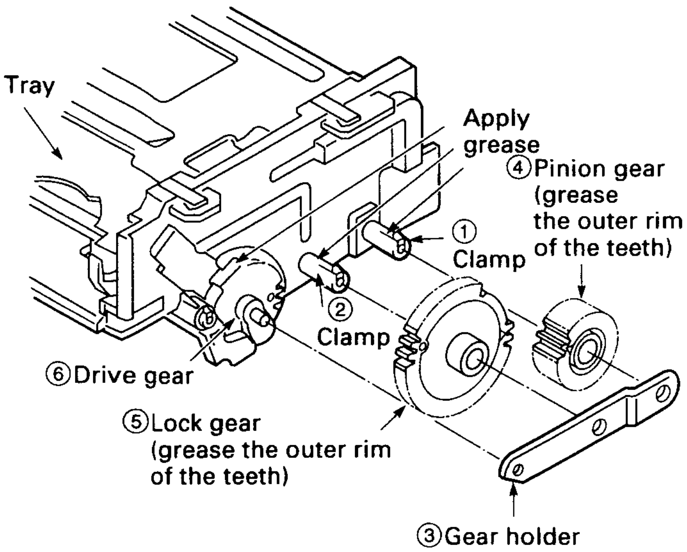

Tray
Apply grease
④Pinion gear (grease the outer rim of the teeth)
① Clamp
② Clamp
⑥Drive gear
⑤Lock gear (grease the outer rim of the teeth)
③Gear holder

Fig.3-3-3

3-3-3. DOOR OPENER, UNDER FRAME AND STAND L (See Fig.3-3-4)

1) Remove the cassette mechanism assembly, referring to section 3-1.
2) Remove the two clamps ① and take out the under frame ②, pulling it towards you.
3) Press down the tray lock lever ③ and the lid opener lever ④, and loosen the tray ⑤, lifting it away from you. In this state, press the clamp ⑥ and remove the door opener lever ⑦.
4) Remove the two clamps ⑧ and take out the stand L ⑨. Be careful not to exert too much force on the clamps ⑧, as this could cause damage.

ASSEMBLY NOTES:

1. Apply grease (VHJ-0100) to the grooves ⑪ on the stand L, the inside of the hole ⑬ in the drive shaft ⑫, and the mounting hole ⑭ in the door opener lever of the stand R.
2. Before fitting the stand L ⑨, be sure to move the tray ⑤ back as far as the EJECT mode position. Put the two pins ⑩ on the tray ⑤ into the grooves ⑪ on the stand L. Put the drive shaft ⑫ into the hole ⑬.
3. Be sure to fasten the two clamps ① and the clamp ⑥ on the stand R, and to fasten the two clamps ⑧ on the stand L.

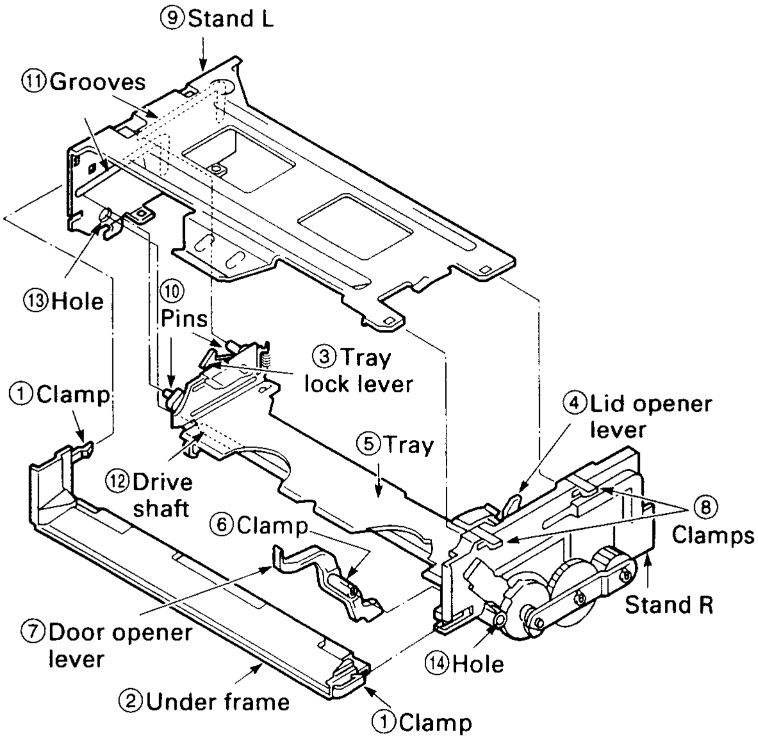

⑨Stand L
⑪Grooves
⑬Hole
⑩ Pins
③Tray lock lever
①Clamp
⑤Tray
④Lid opener lever
⑫Drive shaft
⑥Clamp
⑧ Clamps
Stand R
⑦Door opener lever
⑭Hole
②Under frame
①Clamp

Fig.3-3-4

3-3-4. START RACK GEAR AND FRONT RACK GEAR (See Figs.3-3-5 and 3-3-6)

1) Remove the mechanism unit, referring to section 3-2.
2) Remove the cassette mechanism assembly, referring to section 3-3-1.
3) Remove the special screw ①. When you do this, slide the front rack gear assembly ② towards the front until it stops, then take it off the shaft ③. Take care not to damage the shaft ③.
4) Remove the spring ④.
5) Remove the clamp ⑥ on the front rack gear ⑤, then remove the start rack gear ⑦.

ASSEMBLY NOTES:

1. Apply grease (VHJ-0100) to the front rack gear ⑤ and all over the inside of the groove on the start rack gear ⑦.
2. Align the positioning mark ⑧ on the front rack gear ⑤ with the mark ⑩ on the main cam ⑨.
3. When installing the cassette mechanism assembly, refer to section 3-3-1 and align the start rack gear with the pinion gear.

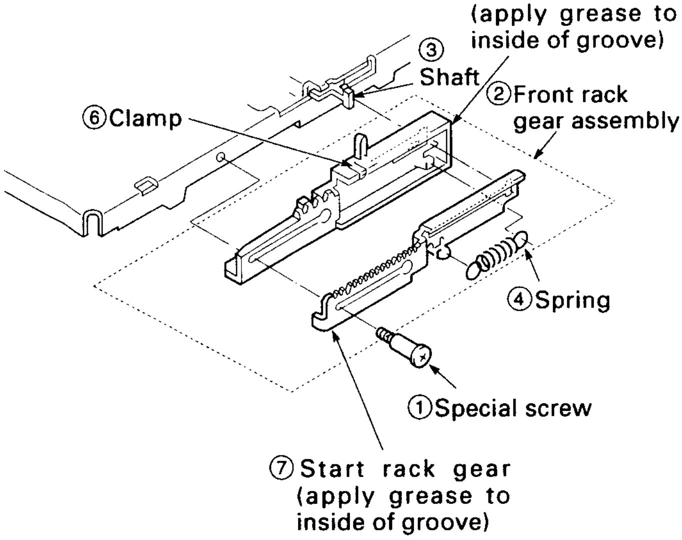

⑤Front rack gear (apply grease to inside of groove)
③ Shaft
②Front rack gear assembly
⑥Clamp
④Spring
①Special screw
⑦Start rack gear (apply grease to inside of groove)

Fig.3-3-5

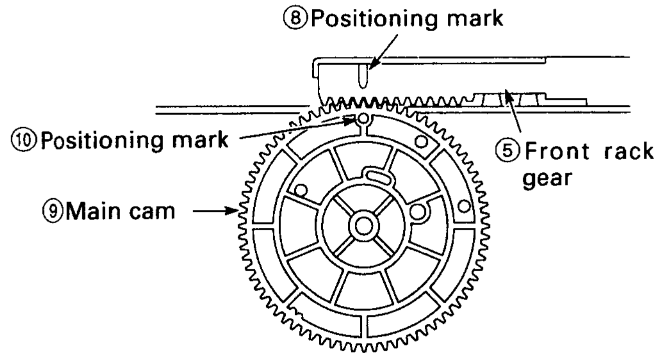

⑧Positioning mark
⑩Positioning mark
⑤Front rack gear
⑨Main cam

Fig.3-3-6

3-4. CLEANER ROLLER ASSEMBLY (See Fig.3-4-1)

1) Remove the clamp ① and take out the cleaner lever ②. When you do this, be careful not to bend the plastic springs Ⓐ and Ⓑon the cleaner lever ②.
2) Remove the clamp ③, and take out the cleaner roller assembly ④. Be careful not to touch the sponge on the cleaner roller assembly ④.

ASSEMBLY NOTES:

1. When mounting the cleaner lever ② on the shaft ⑤, press the clamp ① in the direction shown by the arrow, and snap it into the mounting ⑥ on the audio R/P head assembly.

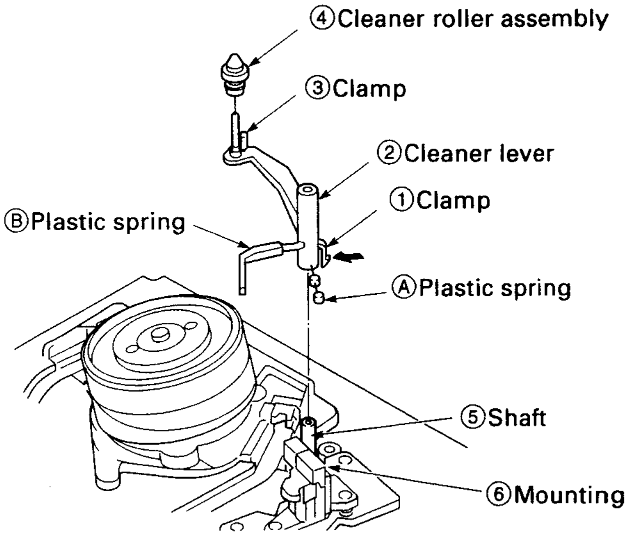

④Cleaner roller assembly
③Clamp
②Cleaner lever
①Clamp
ⒷPlastic spring
ⒶPlastic spring
⑤Shaft
⑥Mounting

Fig.3-4-1

3-5. CYLINDER (DRUM)

3-5-1. UPPER CYLINDER ASSEMBLY (UPPER DRUM) (See Figs. 3-5-1, 3-5-2, 3-5-3, 3-5-4)

There are two types of cylinders, one that can be disassembled into the upper cylinder (upper drum) and lower cylinder (lower drum) and one that cannot. For that type that cannot, replace the cylinder assembly as a whole.

1) Remove the two screws ① (See Fig.3-5-1).
2) First, tighten the handle ② of the video head removing tool (VHJ-0041), then screw the two long screws ③ evenly into the two screw holes ⑤ in the upper cylinder assembly (upper drum) ④ (See Fig. 3-5-2).
3) Hold the tool (VHJ-0041) so that the upper cylinder assembly (upper drum) ④ does not rotate, and at the same time, turn the handle ② clockwise, and remove the upper cylinder assembly (upper drum) ④.
4) Remove the tool (VHJ-0041) from the upper cylinder assembly ④.

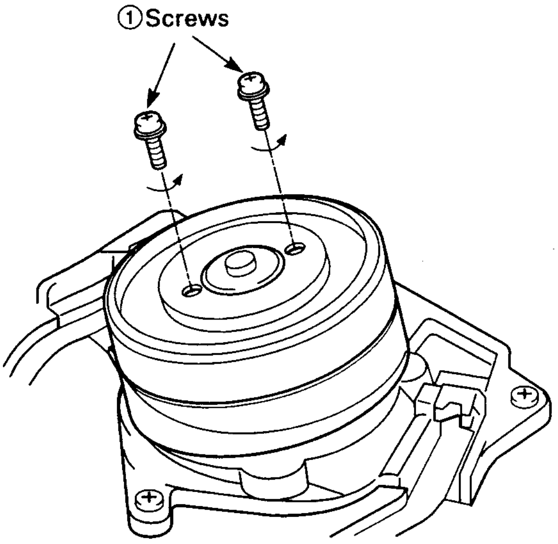


Fig.3-5-1

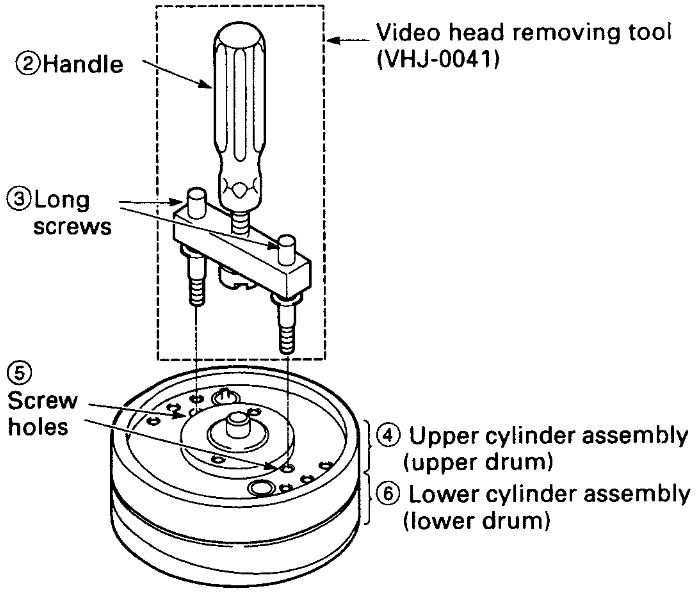

②Handle
Video head removing tool (VHJ-0041)
③Long screws
⑤ Screw holes
④ Upper cylinder assembly (upper drum)
⑥ Lower cylinder assembly (lower drum)

Fig.3-5-2

ASSEMBLY NOTES:

1. When carrying out assembly, the CH-1 head on the upper cylinder assembly (upper drum) ④ and the lower cylinder assembly (lower drum) ⑥ must be aligned. The CH-1 head on the upper cylinder assembly ④ bears a code ⑦ such as 2N2S-V, 2N4N, or 4H6N, as shown in Fig.3-5-3. The CH-1 on the lower cylinder assembly ⑥ has a round hole ⑧, as shown in Fig.3-5-4. Assemble the parts so that the round hole ⑧ is next to the code ⑦ on the upper cylinder assembly.
2. Be careful not to scratch the tape path surface of the cylinder. After replacing the cylinder, clean the tape path surface of the cylinder.
3. After replacing the upper cylinder assembly, do the tape path adjustment as instructed in section 4-3 and do the swithching position adjustment of the servo circuit.

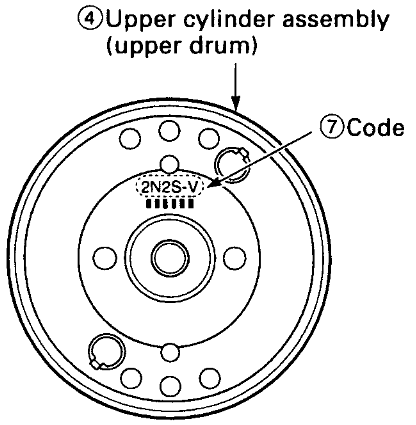
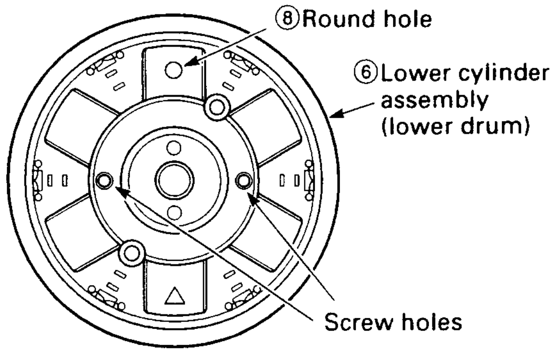

④Upper cylinder assembly (upper drum)
⑦Code
2N2S-V

Fig.3-5-3

[EXCEPT FOR 2-HEAD MONAURAL MODELS]


⑧Round hole
⑥Lower cylinder assembly (lower drum)
Screw holes

[2-HEAD MONAURAL MODELS ONLY]

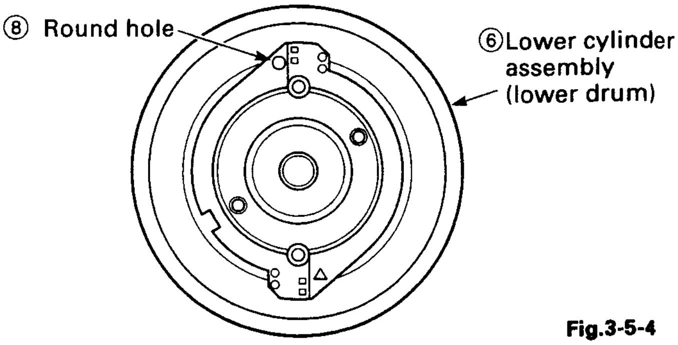

⑧ Round hole
⑥Lower cylinder assembly (lower drum)

Fig.3-5-4

3-5-2. CYLINDER (DRUM) UNIT (See Fig.3-5-5)

1) Put the mechanism into EJECT mode.
2) Refer to section 3-2 and remove the VM-1/VP-1 PWB assembly
3) Refer to section 3-4 and remove the cleaner lever.
4) Remove the two screws ① and take off the bracket ②. The bracket shape varies according to the model.
5) Remove the three screws ③. Taking care not to scratch or soil the tape path surface of the cylinder (drum), lift the mounting cylinder ④ slightly, and keeping it raised.

ASSEMBLY NOTES:

1. Apply grease (VHJ-0100) to the rails (front and rear) of the cylinder mounting ④ (grease the parts which come in contact with the S and T incline mounting assembly).
2. Align the two dowels ⑥ on the mounting cylinder ④ with the two holes ⑦ on the mechanism chassis. Check that connector is inserted in the CP-1 PWB assembly.
3. After assembly, clean the tape path surface of the cylinder (drum).
4. After replacing the cylinder unit, do the tape path adjustment as instructed in section 4-3, and do the switching position adjustment of the servo circuit.

3-5-3. CYLINDER MOTOR (ROTOR AND STATOR) (See Fig.3-5-6)

1) Refer to section 3-2 and remove the mechanism unit.
2) Remove the screw ① and remove the cylinder earth assembly ②.
3) Remove the two screws ③, the rotor ④ and the spacer ⑧.
4) Remove the three screws ⑤ and the stator ⑥.

ASSEMBLY NOTES:

1. When fitting the rotor ④, align the long hole ⑨ -beside the triangular mark on the rotor ④ - with the hole ⑩ in the rotor disk.
2. When fitting the screws ③ and ⑤, use the torque gauge screwdriver (VHJ-0014). Give the screws a tightening torque of 3 kg/cm.
3. Align the dowels ⑪on the cylinder earth assembly ② with the holes ⑫ in the chassis.
4. After fitting the mechanism unit, do the switching position adjustment of the servo circuit.

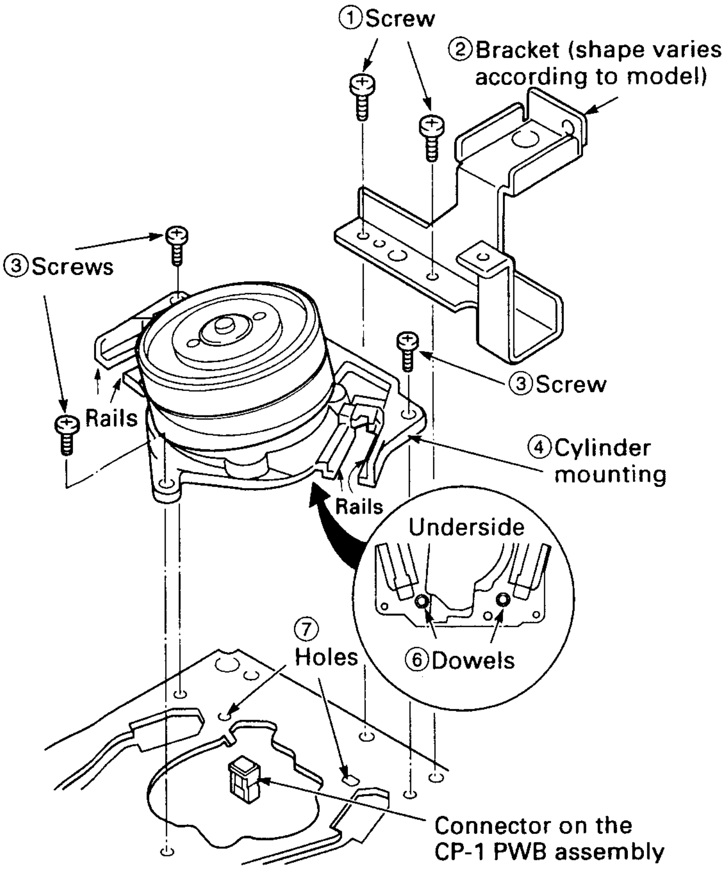

①Screw
②Bracket (shape varies according to model)
③Screws
③Screw
Rails
④Cylinder mounting
Rails
Underside
⑦ Holes
⑥Dowels
Connector on the CP-1 PWB assembly

Fig.3-5-5

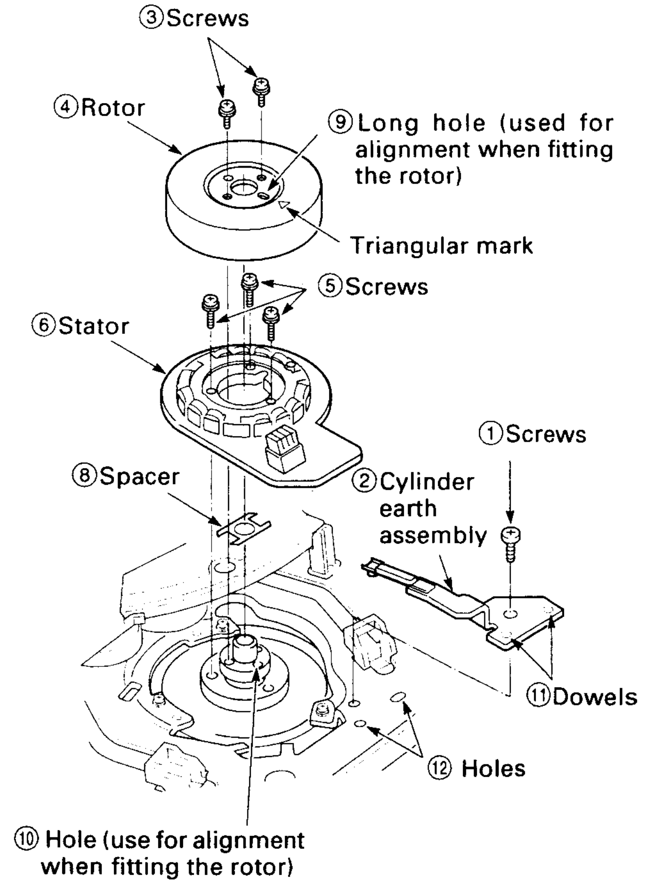

③Screws
④Rotor
⑨Long hole (used for alignment when fitting the rotor)
Triangular mark
⑤Screws
⑥Stator
①Screws
⑧Spacer
②Cylinder earth assembly
⑪Dowels
⑫ Holes
⑩ Hole (use for alignment when fitting the rotor)

Fig.3-5-6

3-5-4. CYLINDER ASSEMBLY (See Fig.3-5-7)

1) Refer to sections 3-5-3, and remove the rotor and the stator.
2) Remove the three screws ① and the cylinder assembly ②.

ASSEMBLY NOTES:

1. Be careful not to scratch or soil the top of the cylinder. After fitting the cylinder, clean the surface.
2. Align the cylinder assembly ② with the two dowels ④ on the mechanism chassis ③.
3. After fitting the cylinder assembly, do the tape path adjustment as instructed in section 4-3 and do the switching position adjustment of the servo circuit.

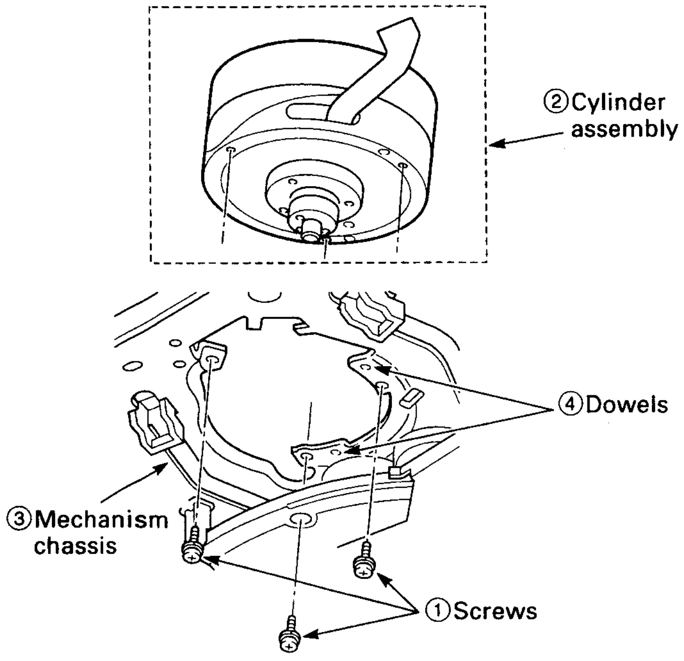


Fig.3-5-7

3-6. FE HEAD AND ACE HEAD

3-6-1. AUDIO R/P HEAD ASSEMBLY (ACE HEAD) (See Fig.3-6-1)

1) Unplug the connector from the audio R/P head assembly (ACE head).
2) Remove the two screws ① and the audio R/P head assembly (ACE head) ②.

ASSEMBLY NOTES:

1. Align the hole ③ on the audio R/P head assembly (ACE head) with the pin ④ on the chassis unit.
2. After assembly, check that the clamp ⑤ on the cleaner roller assembly has snapped into the mounting of the audio R/P head assembly (ACE head) ②.
3. After assembly, clean the surface of the head with a soft cloth or chamois.
4. After assembly, refer to section 4-3, and adjust the head height, the azimuth and the tracking (X) position.

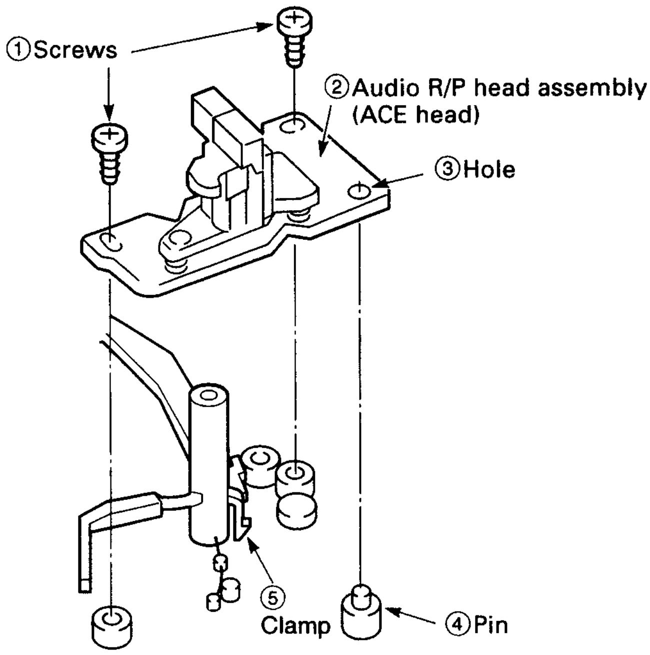


Fig.3-6-1

3-6-2. FULL ERASE HEAD (See Fig.3-6-2)

1) Unplug the connector from the full erase head ①.
2) Remove the screw ② and the full erase head ①.

ASSEMBLY NOTE:

1. After assembly, clean the full erase head ①.

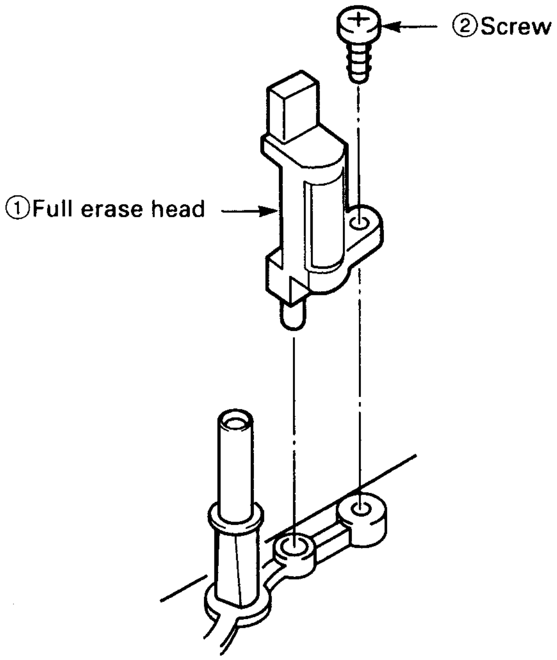


Fig.3-6-2

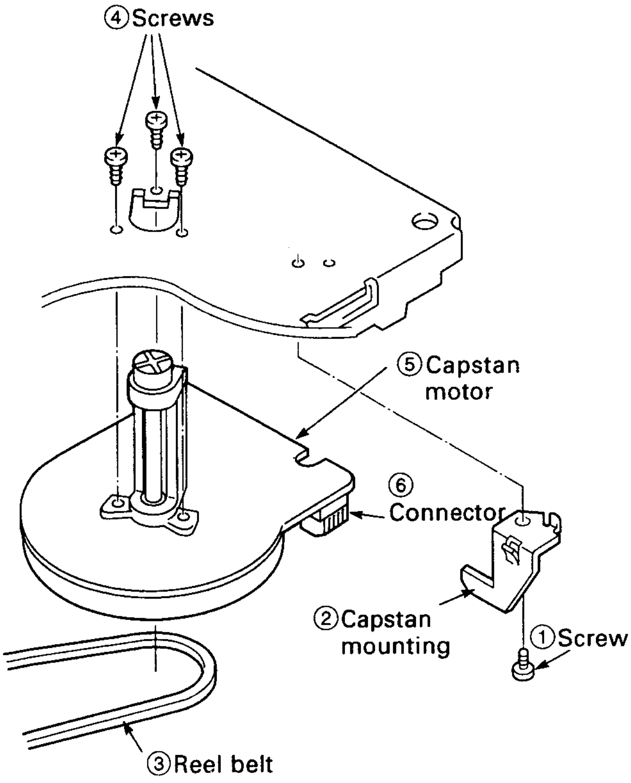
3-7. CAPSTAN MOTOR

3-7-1. CAPSTAN MOTOR (See Fig.3-7-1)

1) Refer to section 3-2, then remove the mechanism unit.
2) Remove the screw ①, then remove the capstan mounting ②.
3) Remove the reel belt ③.
4) Remove the three screws ④ and the capstan motor ⑤.

ASSEMBLY NOTES:

1. Check that connector ⑥ is inserted in the CP-1 PWB assembly.
2. When fitting the three screws ④, use the torque gauge screwdriver (VHJ-0014). Give the screws a tightening torque of 3.5 kg/cm.
3. After assembly, clean the capstan shaft with a soft cloth or chamois.

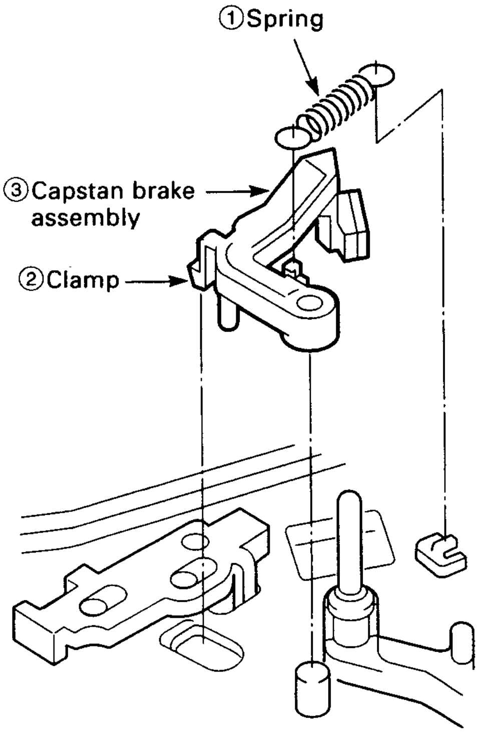


④Screws
⑤Capstan motor
⑥ Connector
②Capstan mounting
①Screw
③Reel belt

Fig. 3-7-1

3-7-2. CAPSTAN BRAKE ASSEMBLY (See Fig.3-7-2)

1) Remove the spring ①.
2) Remove the clamp ②, then remove the capstan brake assembly ③.



①Spring
③Capstan brake assembly
②Clamp

Fig.3-7-2

3-8. LOADING MOTOR ASSEMBLY AND WORM GEAR ASSEMBLY (See Fig.3-8-1)

1) Refer to section 3-2 and remove the mechanism unit.
2) Remove the soldering on the lead wires ② of the loading motor assembly from the MC-1 PWB assembly. When you do this, be careful not to let the soldering iron touch any other parts.
3) Press the clamp ③, and remove the loading motor assembly ① and the damper ④. Be careful not to exert too much force on the clamp ③.
4) Remove the worm gear assembly ⑤. To maintain performance, do not dis-assemble the worm gear assembly ⑤.

ASSEMBLY NOTES:

1. Apply grease (VHJ-0010) to the teeth of the worm gear assembly.
2. Check that the clamps ③ and ⑥ are securing the loading motor assembly.
3. Check the polarity of the lead wires ② (the orange wire is the positive terminal, and the gray wire is the negative terminal). After soldering the lead wires ②, adjust them so that they do not touch the friction gear assembly.

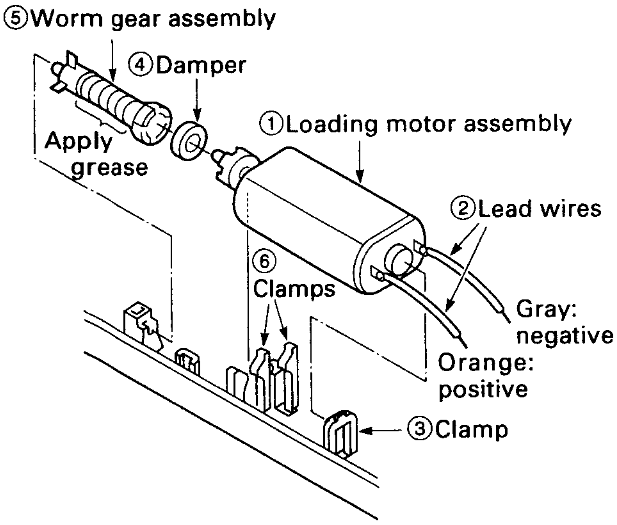

⑤Worm gear assembly
④Damper
①Loading motor assembly
Apply grease
②Lead wires
⑥ Clamps
Gray: negative
Orange: positive
③Clamp

Fig.3-8-1

3-9. PINCH ROLLER PRESSURE MECHANISM

3-9-1. PINCH ROLLER LEVER ASSEMBLY (See Fig.3-9-1)

1) Remove the clamp ①, then remove the pinch lift mounting ②.
2) Remove the spring ③, then remove the pinch roller lever assembly ④ off the pinch lift mounting ②. Before you do this, align the Indentation ⑤ on the pinch roller lever assembly ④ with the clamp ⑥ on the pinch lift mounting ②.

ASSEMBLY NOTE:

1. Be careful to keep the surface of the pinch roller free of dust and dirt.

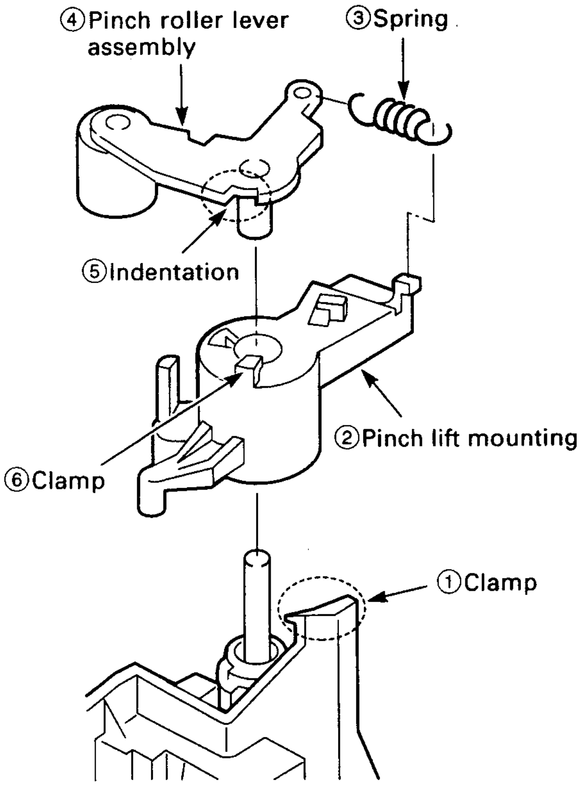

④Pinch roller lever assembly
③Spring
⑤Indentation
②Pinch lift mounting
⑥Clamp
①Clamp

Fig.3-9-1

3-9-2. PINCH LIFT CAM AND PINCH CAM GEAR (See Figs.3-9-2 and 3-9-3)

1) Refer to section 3-2 and remove the mechanism unit. When you do this, make sure the mechanism is in EJECT mode.
2) Refer to section 3-9-1 and remove the pinch roller lever assembly.
3) After removing the screw ①, undo the three clamps ②, then remove the opener mounting ③.
4) Remove the clamp ④ and the pinch lift cam ⑤.
5) Remove the pinch cam gear ⑥.

ASSEMBLY NOTES:

1. Apply grease (VHJ-0100) around the shaft ⑦, all over the teeth Ⓑ of the pinch cam gear ⑥, all over the teeth of the pinch lift cam ⑤, all over the cam grooves Ⓐ, and all over the "V Part Ⓒ" of the opener mounting ③. Apply grease (VHJ-0101) to the outside of the shaft ⑧ and all over the top cam Ⓓ of the pinch cam gear ⑥.
2. Check that the positioning mark ⑩ on the mode switch ⑨ is aligned with the arrow ⑪ on the MC-1 PWB assembly, as shown in Fig.3-9-3. Then align the triangular mark ⑫ on the pinch cam gear ⑥ with the arrow ⑪ on the MC-1 PWB assembly. After that, align the round hole ⑬ on the pinch lift cam ⑤ with the indentation ⑭ on the pinch cam gear ⑥.
   If you have carried out the above alignments and the pinch roller will still not move up and down or perform the pressing movement correctly, refer to section 3-15 and check the alignment of the gear wheels 1 and 2, the main cam, and the mode switch.

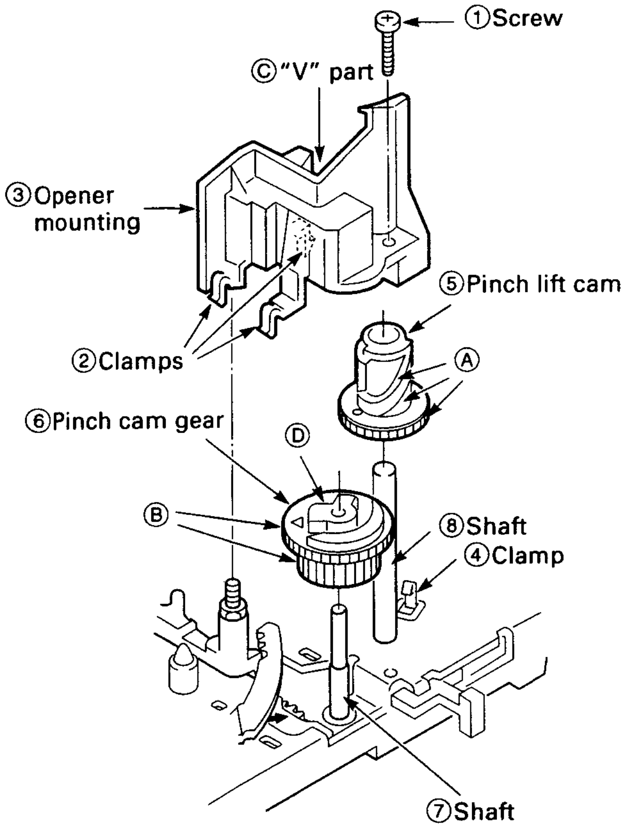

①Screw
Ⓒ"V" part
③Opener mounting
⑤Pinch lift cam
Ⓐ
②Clamps
⑥Pinch cam gear
Ⓓ
Ⓑ
⑧Shaft
④Clamp
⑦Shaft

Fig.3-9-2

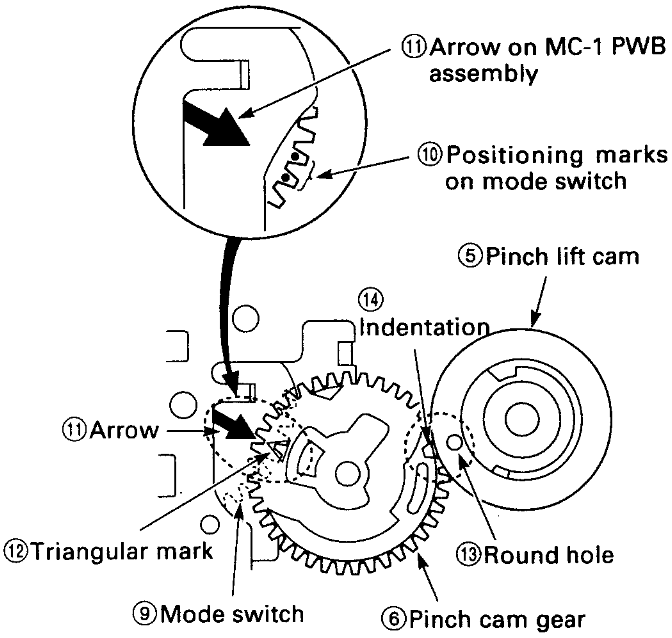

⑪Arrow on MC-1 PWB assembly
⑩Positioning marks on mode switch
⑤Pinch lift cam
⑭ Indentation
⑪Arrow
⑫Triangular mark
⑬Round hole
⑨Mode switch
⑥Pinch cam gear

Fig.3-9-3

3-10. L GUIDE LEVER ASSEMBLY AND LOAD LEVER ASSEMBLY (See Figs.3-10-1)

1) Refer to section 3-3 and remove the cassette mechanism assembly.
2) Refer to sections 3-9-1 and 3-9-2 ,then remove the pinch roller lever assembly and the opener mounting.
3) After removing the washer ④, remove the L guide act lever assembly ⑤.
4) Remove the special nut ⑥, then remove the load lever assembly ⑦ and the L guide lever spring ⑧.

ASSEMBLY NOTES:

1) Apply grease (VHJ-0100) to the toothed area Ⓐ of the L guide act lever assembly ⑤ and around the shafts ⑨ and ⑩.
2) Refer to section 4-3 and adjust the height of the load lever assembly.
3) Hook the L guide lever spring ⑧ into the stopper ⑬ and load lever assembly ⑦ shown in Fig. A.
4) Put the pin ⑪ of the L guide act lever assembly into the cam groove ⑫ of the crescent slide.

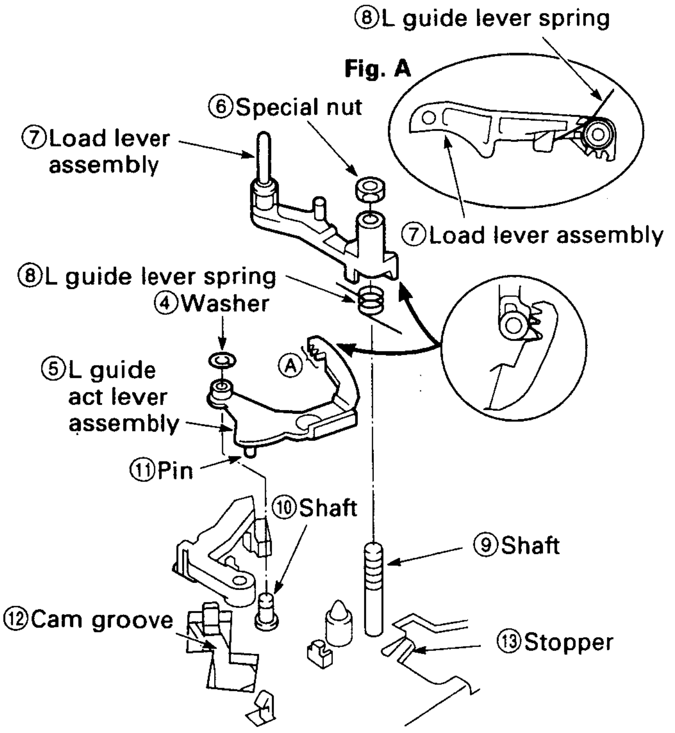

⑧L guide lever spring
Fig. A
⑥Special nut
⑦Load lever assembly
⑦Load lever assembly
⑧L guide lever spring
④Washer
⑤L guide act lever assembly
Ⓐ
⑪Pin
⑩Shaft
⑨Shaft
⑫Cam groove
⑬Stopper

Fig.3-10-1

3-11. BT LEVER ASSEMBLY (See Fig.3-11-1)

1) Refer to section 3-2 and remove the mechanism unit.
2) Refer to section 3-3-1 and remove the cassette mechanism assembly.
3) Remove the BT spring ①.
4) Remove the clamp ② on the underside of the mechanism chassis, then remove the BT lever assembly ③.
5) Remove the clamp ⑤ on the band brake assembly ④. Then, as shown in Fig. A, align the other end of the band brake assembly with the protruding parts of the BT lever assembly ③ before removing it.

ASSEMBLY NOTES:

1. When fitting the BT lever assembly ③, be careful not to bend the stopper ⑥ or the S incline mounting assembly ⑦ out of shape by knocking it against them.
2. Hook the long hook of the BT spring ① into the BT lever assembly ③, as shown in Fig. B.
3. After assembly, make sure that the mountings on both ends of the band brake assembly④ are positioned as shown in Fig. C.
4. After assembly, refer to section 4-2-1, and make the appropriate adjustment.

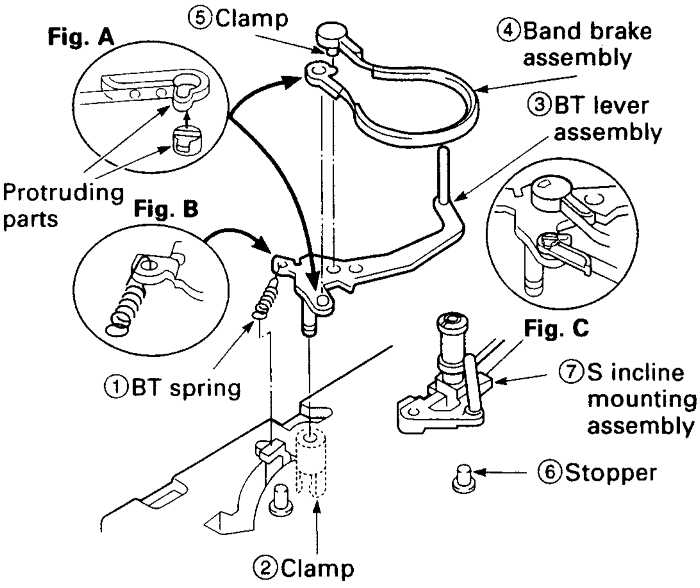


Fig. A
⑤Clamp
④Band brake assembly
③BT lever assembly
Protruding parts
Fig. B
Fig. C
⑦S incline mounting assembly
①BT spring
⑥Stopper
②Clamp

Fig.3-11-1

3-12. REEL DRIVE MECHANISM

3-12-1.REEL BELT, REEL PULLEY, FRICTION GEAR ASSEMBLY AND CLUTCH CHANGE LEVER (See Fig.3-12-1)

1) Refer to section 3-2 and remove the mechanism unit.
2) Remove the reel belt ① from the reel pulley ②.
3) Take off the washer ③ and remove the reel pulley ②.
4) Take off the washer ④ and remove the friction gear assembly ⑤.
5) Remove the clutch change spring ⑥.
6) remove the clamp ⑦ gripping the top of the mechanism chassis, then remove the clutch change lever ⑧.

ASSEMBLY NOTES:

1. After cleaning the shafts ⑨ and ⑩, apply a drop of oil (VHJ-0099) to each.
2. Be careful not to get any grease on the reel belt ①.

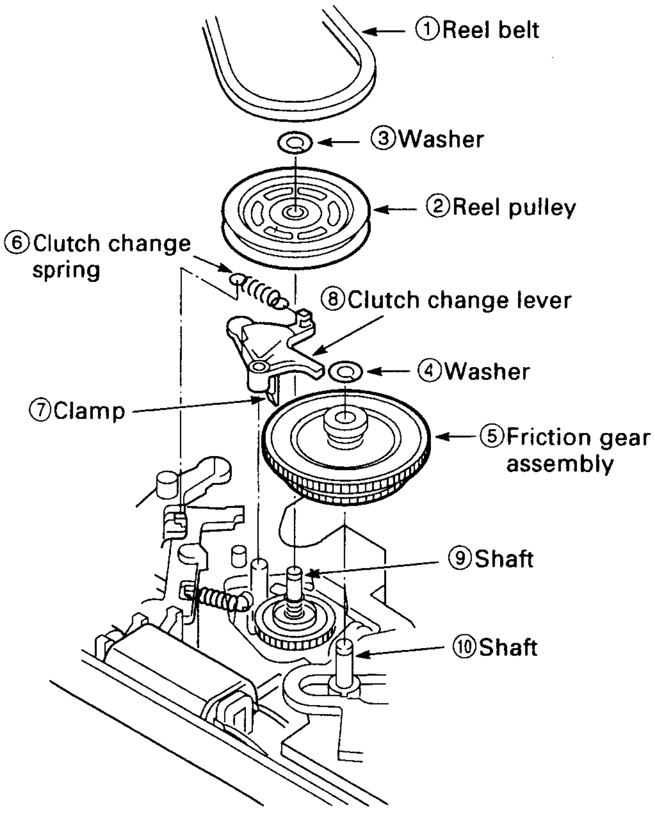

①Reel belt
③Washer
②Reel pulley
⑥Clutch change spring
⑧Clutch change lever
④Washer
⑦Clamp
⑤Friction gear assembly
⑨Shaft
⑩Shaft

Fig.3-12-1

3-12-2.CLUTCH MOUNTING ASSEMBLY (See Fig.3-12-2)

1) Refer to section 3-3-1 and remove the cassette mechanism assembly.
2) Refer to section 3-12-1 and remove the reel pulley.
3) Remove the two screws ①, then remove the clutch mounting assembly ②.

ASSEMBLY NOTES:

1. Align the two holes ③ with the shafts ④ and ⑤. Be careful not to press part A of the clutch mounting assembly ② against the band brake assembly.
2. After assembly, make sure that the clamp on the clutch change lever has snapped into the chassis.

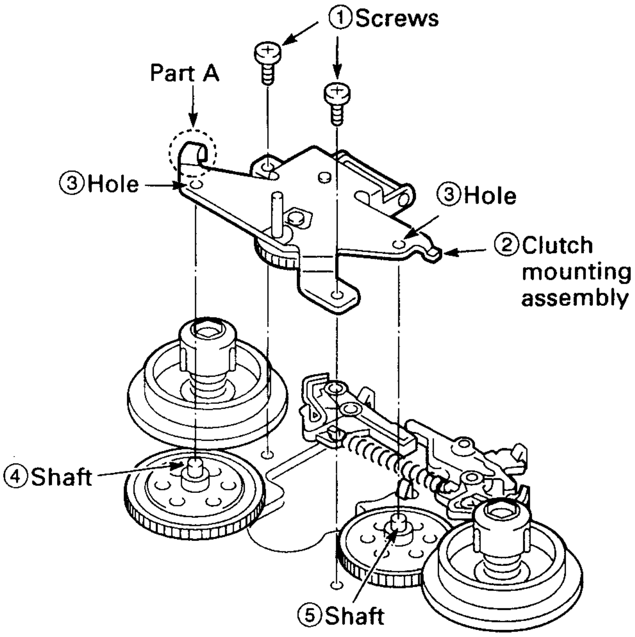

①Screws
Part A
③Hole
③Hole
②Clutch mounting assembly
④Shaft
⑤Shaft

Fig.3-12-2

3-12-3.S SOFT LEVER, SUPPLY REEL ASSEMBLY AND S REEL GEAR (See Fig.3-12-3)

1) Remove the S soft spring ①.
2) Remove the clamp ②, then remove the S soft lever ③.
3) Refer to section 3-12-2 and remove the clutch mounting assembly.
4) Refer to section 3-11 and remove the band brake assembly, then remove the supply reel assembly ④ and the S reel gear ⑤.

ASSEMBLY NOTES:

1. After cleaning the shafts ⑥ and ⑦, apply a drop of oil (VHJ-0099) to each.
2. After assembly, clean the side of the supply reel assembly ④.

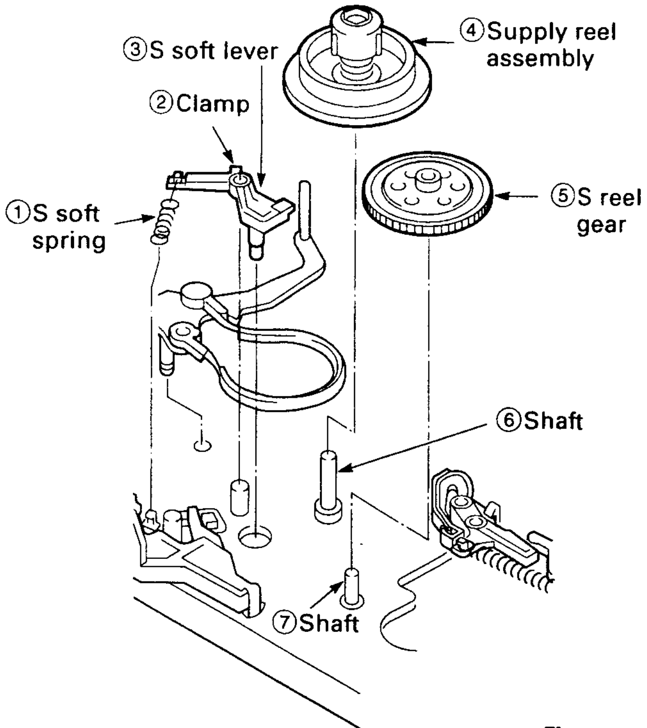

③S soft lever
④Supply reel assembly
②Clamp
⑤S reel gear
①S soft spring
⑥Shaft
⑦Shaft

Fig.3-12-3

3-12-4. T SOFT BRAKE ASSEMBLY, TAKE UP REEL ASSEMBLY, T REEL GEAR (See Fig.3-12-4)

1) Remove the T soft spring ①.
2) Remove the clamp ②, then remove the T soft brake assembly ③.
3) Refer to section 3-12-2 and remove the clutch mounting assembly.
4) Pressing the T brake assembly ④ in the direction of the arrow, remove the take up reel assembly ⑤ and the T reel gear ⑥.

ASSEMBLY NOTE:

1. After cleaning the shafts ⑦ and ⑧, apply a drop of oil (VHJ-0099) to each.

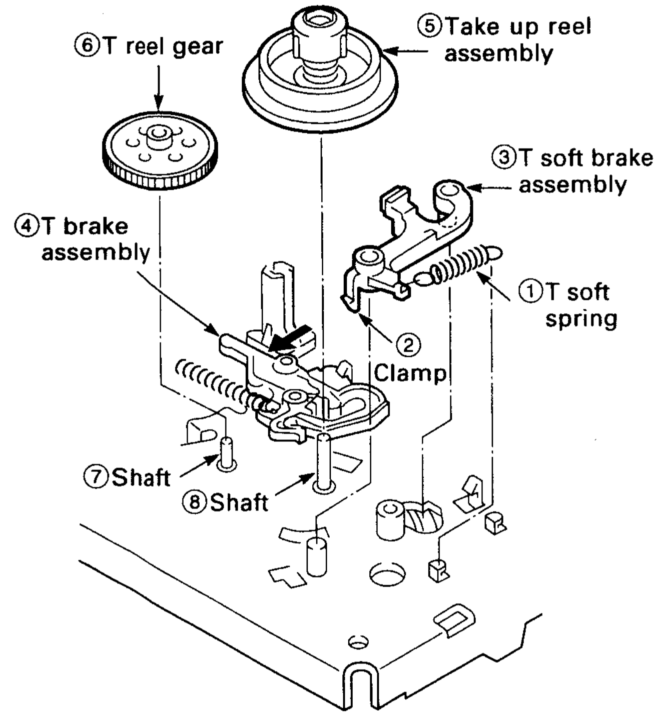

⑥T reel gear
⑤Take up reel assembly
③T soft brake assembly
④T brake assembly
①T soft spring
②Clamp
⑦Shaft
⑧Shaft

Fig.3-12-4

3-13. BRAKES

3-13-1. S BRAKE ASSEMBLY, T BRAKE ASSEMBLY, T BRAKE ACT SLIDE (See Fig.3-13-1)

1) Refer to section 3-3-1 and remove the cassette mechanism assembly.
2) Remove the two clamps ①, then remove the T brake act slide ②. (Note: You can remove the S brake assembly ⑦ and the T brake assembly ⑤ without removing the T brake act slide ②.)
3) Remove the brake spring ③.
4) Remove the two clamps ④ simultaneously, then remove the T brake assembly ⑤.
5) Remove the clamp ⑥, then remove the S brake assembly ⑦.

ASSEMBLY NOTES:

1. Apply grease (VHJ-0100) to the shafts ⑧ and ⑨.
2. When fitting the T brake act slide ②, align the mark ⑩ with the shaft ⑪.

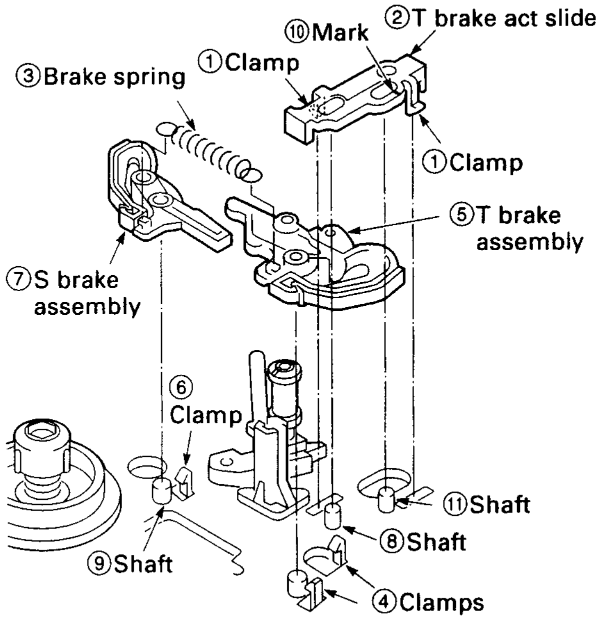

⑩Mark
②T brake act slide
③Brake spring
①Clamp
①Clamp
⑤T brake assembly
⑦S brake assembly
⑥Clamp
⑪Shaft
⑧Shaft
⑨Shaft
④Clamps

Fig.3-13-1

3-13-2. BRAKE CONTROL LEVER AND BRAKE ACT LEVER ASSEMBLY (See Fig.3-13-2)

1) Refer to section 3-2 and remove the mechanism unit.
2) Refer to section 3-15 and remove the wheel gear 2.
3) Refer to sections 3-12-1, then remove the reel belt and the reel pulley.
4) Remove the clamp ①, then remove the wheel gear 1 ②.
5) Remove the clutch change spring ③.
6) Remove the clamps ④ and ⑤, then remove the brake control lever ⑥. Remove the clamp ④ on the topside of the mechanism chassis.
7) Remove the brake return spring ⑦.
8) Refer to section 3-8 and remove the worm gear assembly.
9) Remove the clamp ⑧ and clamp ⑤, then remove the brake act lever assembly ⑨. To maintain the performance of the brake act lever assembly ⑨, do not disassemble it.

ASSEMBLY NOTES:

1. Apply grease (VHJ-0100) to the shafts ⑩ and ⑪, to the teeth of the wheel gear 1 ②, and to the pin ⑫ of the brake control lever ⑥.
2. Put the pin ⑫ of the brake control lever ⑥ into the cam groove ⑭ of the crescent slide.
3. Before fitting the wheel gear 1 ②, align the hole ⑮ with the hole ⑯ on the mechanism chassis.
4. Refer to section 3-15 and align the wheel gear 2.

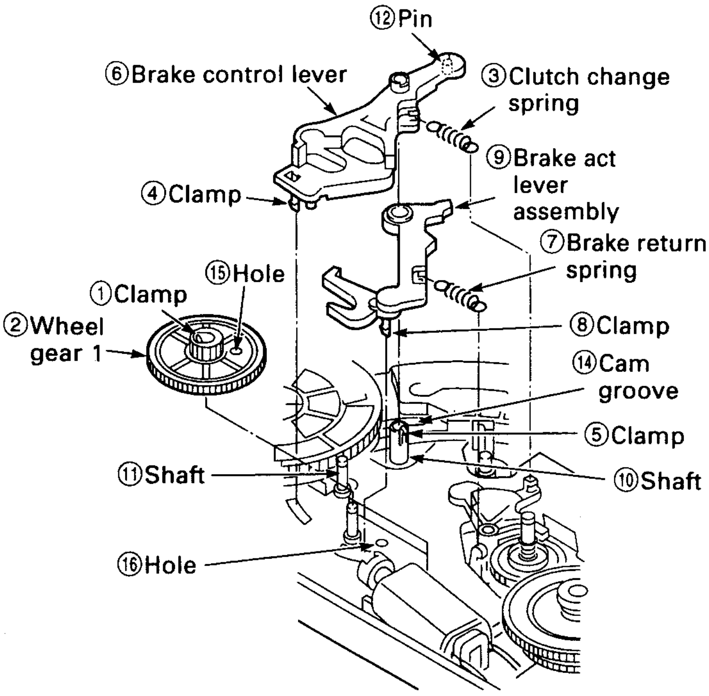

⑫Pin
⑥Brake control lever
③Clutch change spring
⑨Brake act lever assembly
④Clamp
⑦Brake return spring
⑮Hole
①Clamp
②Wheel gear 1
⑧Clamp
⑭Cam groove
⑤Clamp
⑪Shaft
⑩Shaft
⑯Hole

Fig.3-13-2

3-13-3. S BRAKE ACT SLIDE AND BT SPRING LEVER ASSEMBLY (See Figs.3-13-3 and 3-13-4)

1) Refer to section 3-16 and remove the crescent slide.
2) Refer to section 3-12-1 and remove the friction gear assembly.
3) Slide the S brake act slide ① in the direction of the arrow Ⓐ, then remove it.
4) Refer to section 3-11 and remove the BT spring.
5) Press the BT spring lever assembly ② until it touches the pin ③, then remove it.

ASSEMBLY NOTES:

1. Apply grease (VHJ-0100) to the shaft ④ shown in Fig. 3-13-3, and to the BT spring lever assembly ② and the S brake act slide ① shown in Fig.3-13-4.
2. After mounting the BT spring lever assembly ② on the Shaft ④, hook the BT spring onto the clamp ⑤ and press it until it touches the pin ⑥.
3. Make sure that the clamps ⑦, ⑧ and ⑨ have snapped into the S brake act slide ①. Align the arrow ⑩ on the S brake act slide ① with the arrow ⑪ on the mechanism chassis.

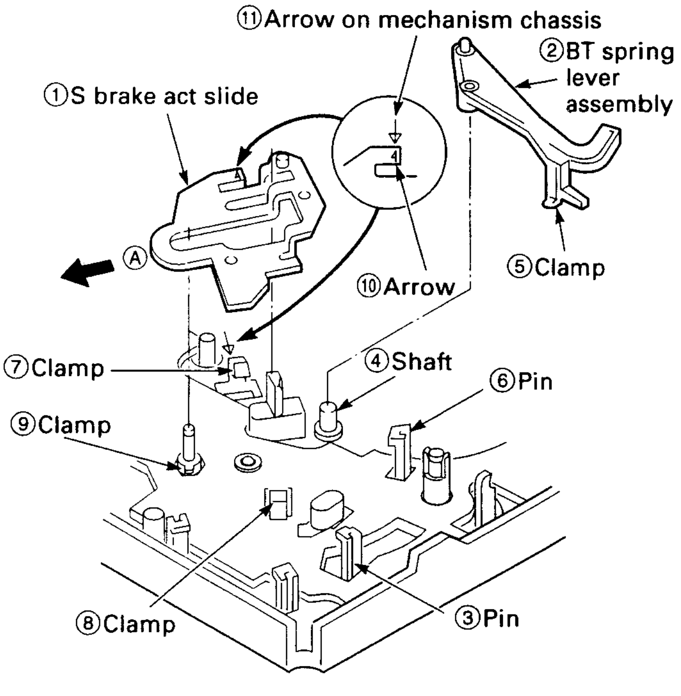

⑪Arrow on mechanism chassis
②BT spring lever assembly
①S brake act slide
Ⓐ
⑩Arrow
⑤Clamp
⑦Clamp
④Shaft
⑥Pin
⑨Clamp
⑧Clamp
③Pin

Fig.3-13-3

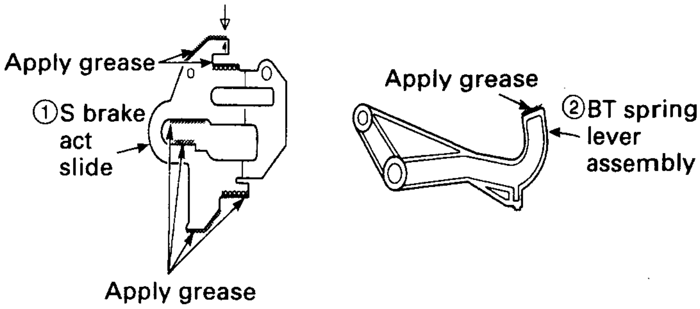

Apply grease
①S brake act slide
Apply grease
Apply grease
②BT spring lever assembly

Fig.3-13-4

3-14. GUIDES

3-14-1. GUIDE ROLLER ASSEMBLY (See Fig.3-14-1)

1) Unscrew the two screws ①. When you do this, be careful not to damage the cylinder or the video head.
2) Remove the two guide roller assemblies ②by unscrewing them anticlockwise.

ASSEMBLY NOTES:

1. Tighten the two screws ① to a torque of 600 g/cm. After tightening, apply a screw-locking glue.
2. After replacing the parts, be sure to clean the guide roller and carry out tape path adjustment as described in section 4-3.

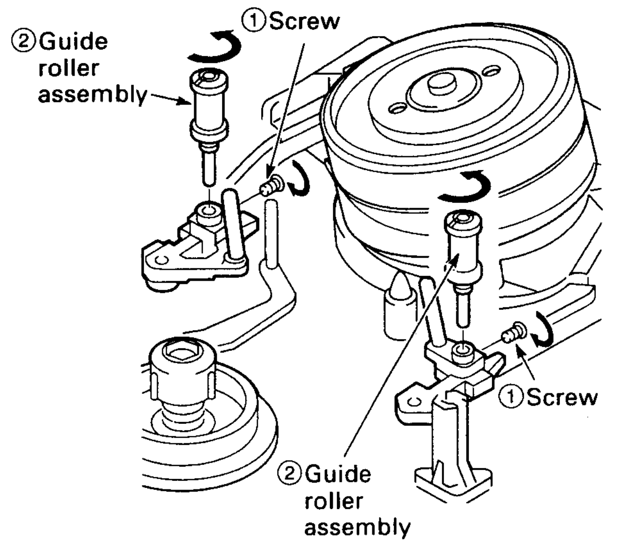

①Screw
②Guide roller assembly
①Screw
②Guide roller assembly

Fig.3-14-1

3-14-2. S AND T INCLINE MOUNTING ASSEMBLIES (See Fig.3-14-2)

1) Refer to section 3-2 and remove the mechanism unit.
2) Refer to section 3-4 and remove the cleaner lever.
3) Remove the four screws ⑤ and take off the two catcher mountings ⑥.
4) Refer to section 3-1 and rotate the loading motor in the PLAY direction until tape loading is completed.
5) Shift the S incline mounting assembly ① slightly, in the direction of the arrow Ⓐ, then remove it from the S load lever assembly ②.
6) Shift the T incline mounting assembly ③ slightly, in the direction of the arrow Ⓑ, then remove it from the T load lever assembly ④.

ASSEMBLY NOTES:

1. Apply grease (VHJ-0100) to the rail (top, underside and sides) on the mechanism chassis.
2. When fitting the S and T incline mounting assemblies ① and ③ into the rail, turn the loading motor manually in the EJECT direction. When tape unloading begins, watch out in case the S and T incline mounting assemblies ① and ③ get caught in the rail.
3. Aline the dowels on the catcher mounting ⑥ with the holes ⑦ in the mechanism chassis.
4. After replacing the parts, clean the cylinder and the roller guide, then adjust the tape path as described in section 4-3.

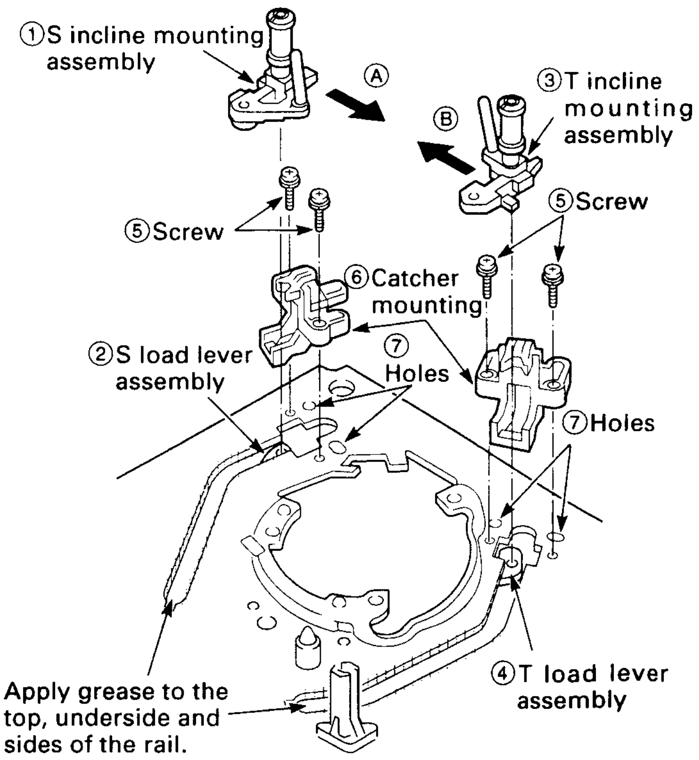

①S incline mounting assembly
Ⓐ
Ⓑ
③T incline mounting assembly
⑤Screw
⑤Screw
⑥Catcher mounting
②S load lever assembly
⑦ Holes
⑦Holes
Apply grease to the top, underside and sides of the rail.
④T load lever assembly

Fig.3-14-2

3-15. WHEEL GEAR 2, MAIN CAM AND MODE SWITCH (See Figs.3-15-1 and 3-15-2)

1) Refer to section 3-2 and remove the mechanism unit. When you do this, make sure the mechanism is in EJECT mode.
2) Refer to section 3-7-1, then remove the harness mounting.
3) Remove the clamp ①, then remove the wheel gear 2 ②.
4) Remove the washer ③, then remove the main cam ④.
5) After unscrewing the screw ⑤, remove the soldering from the terminal of the mode switch ⑥.
6) Remove the clamp ⑦, then remove the mode switch ⑥.

ASSEMBLY NOTES:

1. Apply grease (VHJ-0100) to the shafts ⑧, ⑨ and ⑩, to the teeth of the main cam ④, and to the all over the cam groove of main cam ④.
2. When fitting the mode switch ⑥, align it in ⒶⒷ order as shown in Fig.3-15-2. The alignment of the part Ⓑ is shown in Fig. A. Position the teeth of the mode switch ⑥ so that the sixth tooth space left of part Ⓐ is aligned with the triangular mark on the pinch cam gear ⑪. After aligning part Ⓑ, refer to section 3-9-2 and check the positioning of the mode switch, the pinch cam gear and the pinch lift cam.
3. Beforehand, remove the soldering from the soldered part of the MC-1 PWB assembly, in order to prevent the mode switch ⑥ being warped. Solder the mode switch ⑥ after tightening the screw ⑤ (See Fig. 3-15-1).
4. Align the hole in the crescent slide ⑫ with the hole in the mechanism chassis, as shown at point Ⓖ in Fig.3-15-2 (refer to section 3-16 and see the holes ⑤ and ⑥ in Fig.3-16-1).
5. When fitting the main cam ④, position the mode switch ⑥ and the front rack gear ⑬ as shown at points Ⓒ and Ⓓ respectively in Fig.3-15-2.
6. When fitting the gear wheel 2 ②, position the main cam ④ and the wheel gear 1 ⑭ as shown at points Ⓔ and Ⓕ respectively in Fig.3-15-2.

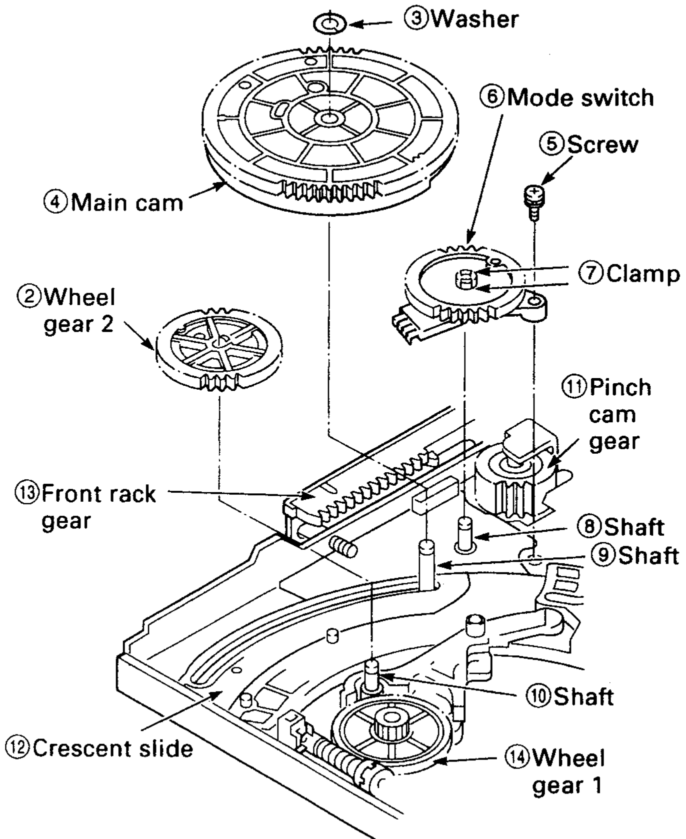

③Washer
⑥Mode switch
⑤Screw
④Main cam
⑦Clamp
②Wheel gear 2
⑪Pinch cam gear
⑬Front rack gear
⑧Shaft
⑨Shaft
⑩Shaft
⑫Crescent slide
⑭Wheel gear 1

Fig.3-15-1

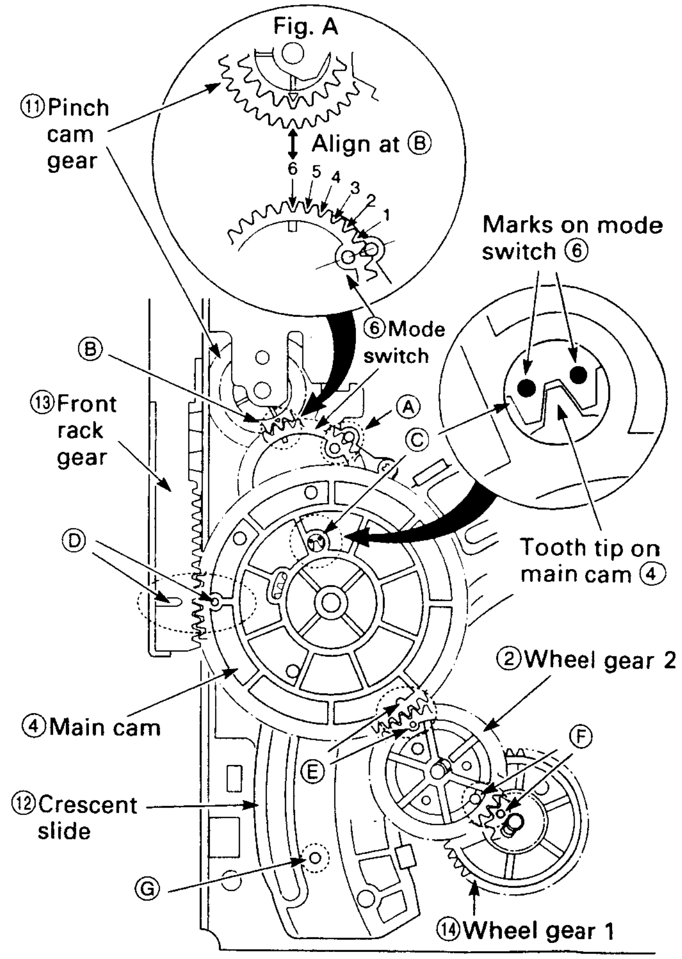


Fig. A
⑪Pinch cam gear
Align at Ⓑ
6
5
4
3
2
1
Marks on mode switch ⑥
⑥Mode switch
Ⓑ
⑬Front rack gear
Ⓐ
Ⓒ
Ⓓ
Tooth tip on main cam ④
②Wheel gear 2
④Main cam
Ⓕ
Ⓔ
⑫Crescent slide
Ⓖ
⑭Wheel gear 1

Fig.3-15-2

3-16. CRESCENT SLIDE
(See Figs.3-16-1 and 3-16-2)

1) Refer to section 3-2 and remove the mechanism unit. When you do this, make sure the mechanism is in EJECT mode.
2) Refer to section 3-3-1 and remove the cassette mechanism assembly.
3) Refer to section 3-7-2 and remove the capstan brake assembly.
4) Refer to section 3-12-4 and remove the T soft brake assembly.
5) Refer to section 3-13-1 and remove the T brake act slide.
6) Refer to section 3-12-1, then remove the reel belt and the reel pulley.
7) Refer to section 3-15, then remove the wheel gear 2 and the main cam.
8) Refer to section 3-13-2, then remove the wheel gear 1 and the brake control lever.
9) Remove the two screws ⑪, then remove the crescent mounting ⑫.
10) Remove the clamps ① and ②, then raise the right end of the crescent slide ③ slightly. Slide the crescent slide ③ to the right until it comes away from the clamp ④, then remove it.

ASSEMBLY NOTES:

1. Apply grease (VHJ-0100) to the points Ⓐ,Ⓑ,Ⓒ and Ⓓ in Fig.3-16-1, and to the crescent slide ③ shown in Fig.3-16-2.
2. Before fitting the crescent slide ③, refer to section 3-13-3 and align the arrow on the S brake act slide with the arrow on the mechanism chassis. Then refer to Fig.3-17-3 and check that the S load gear and the T load gear have completed tape unloading.
3. When assembling the parts, raise the right side of the crescent slide ③ slightly, and keeping it in this position, slot the left side into the clamp ④, then align the hole ⑤ with the hole ⑥ in the mechanism chassis. When you do this, check that the hole ⑦ is aligned with the pin ⑧ on the BT spring lever assembly, and that the hole ⑨ is aligned with the pin ⑩ on the S brake act slide, before pressing the crescent slide ③ into place. Check that the clamps ①, ② and ④ are engaged.
4. After assembly, check that each lever and each brake is working properly.

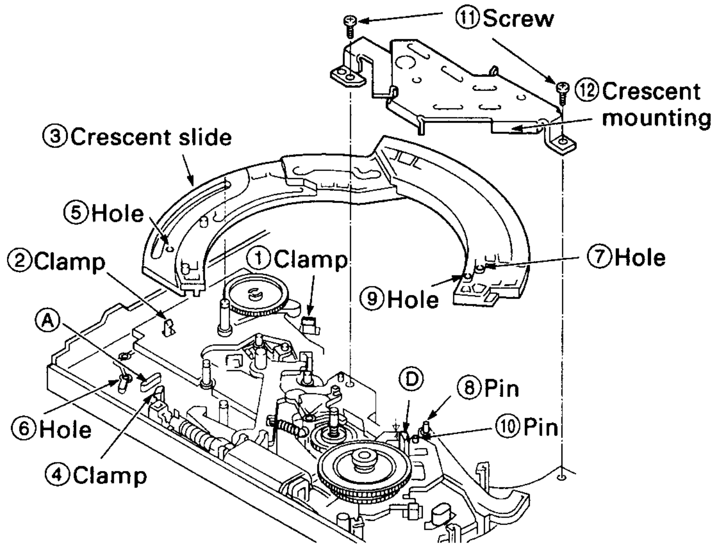


Fig.3-16-1

Apply grease to the areas shown in ▨
- The places marked by dots should be greased particularly generously.

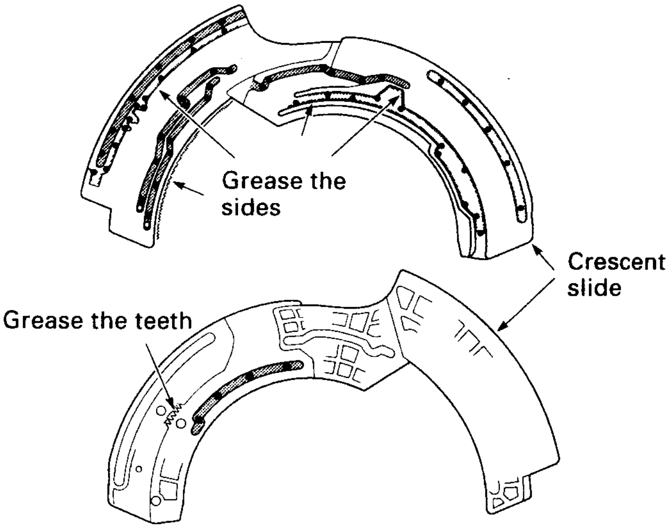


Fig.3-16-2

3-17. S LOAD GEAR, T LOAD GEAR, S LOAD LEVER ASSEMBLY AND T LOAD LEVER ASSEMBLY (See Figs.3-17-1, 3-17-2 and 3-17-3)

1) Refer to section 3-16 and remove the crescent slide.
2) Refer to section 3-14-2 and remove the S and T incline mounting assemblies.
3) Remove the clamp ①, then remove the components: the S load gear ②, the S load spring ③ and the S load lever assembly ④. When you do this, be careful not to damage the clamp ①, which can be damaged easily. Again, be careful when you disassemble the components, as the S load spring ③ will spring out.
4) Remove the following components: the T load gear ⑤, the T load spring ⑥, and the T load lever assembly ⑦. Be careful when you disassemble the components, as the T load spring ⑥ will spring out.

ASSEMBLY NOTES:

1. Apply grease (VHJ-0100) to the shafts ⑧, ⑨ and parts A shown in Fig.3-17-1. Then apply grease (VHJ-0100) to the parts shown in Fig.3-17-2.
2. When fitting the S load gear ② and the T load gear ⑤ align them in the tape-loaded state, as shown in Fig. A in Fig.3-17-3. Again, after completing tape-unloading on these gears, check that they are positioned as shown in Fig. B in Fig.3-17-3, then refer to section 3-14-2 and fit the S and T incline mounting assemblies.

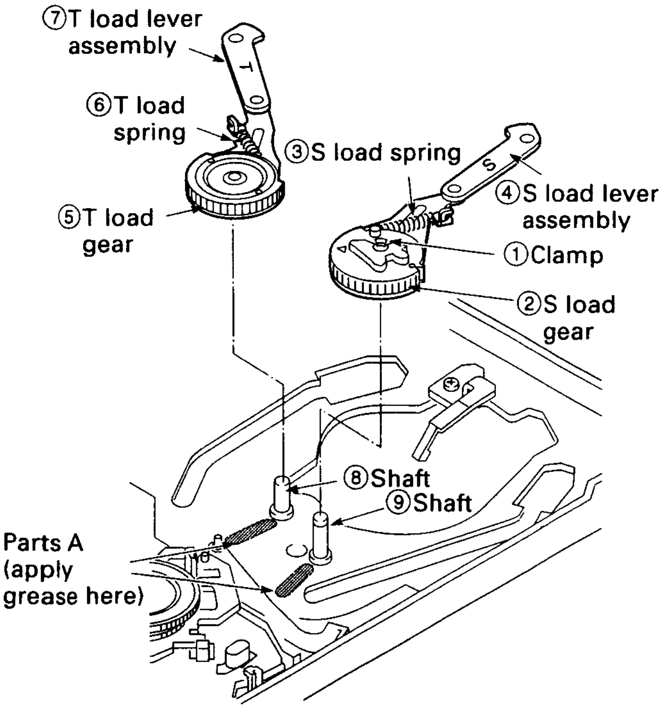
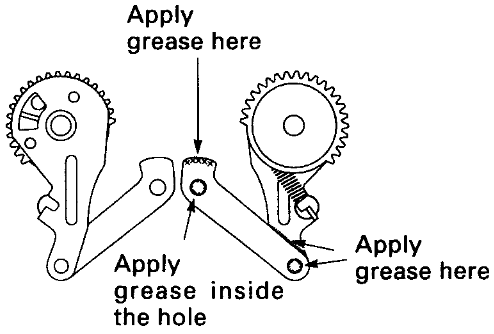

⑦T load lever assembly
⑥T load spring
③S load spring
④S load lever assembly
①Clamp
⑤T load gear
②S load gear
⑧Shaft
⑨Shaft
Parts A (apply grease here)

Fig.3-17-1

(T side)


Apply grease here
Apply grease here
Apply grease inside the hole

(S side)

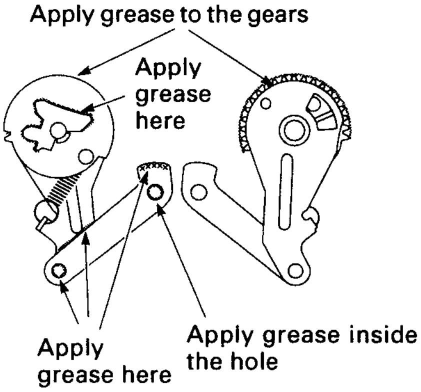

Apply grease to the gears
Apply grease here
Apply grease here
Apply grease inside the hole

Fig.3-17-2

Fig. A: When tape loading is complete

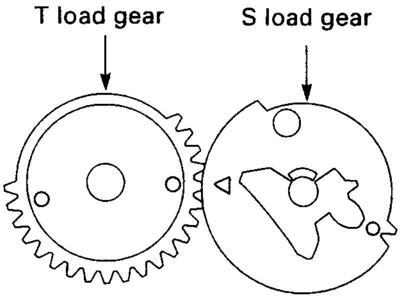

T load gear
S load gear

Fig. B: When tape unloading is complete

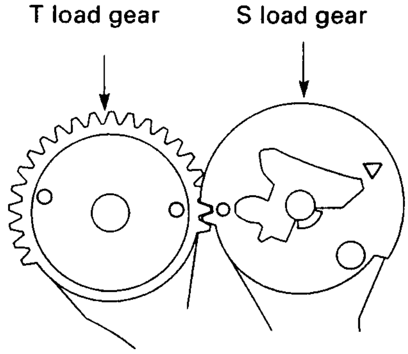

T load gear
S load gear

Fig.3-17-3

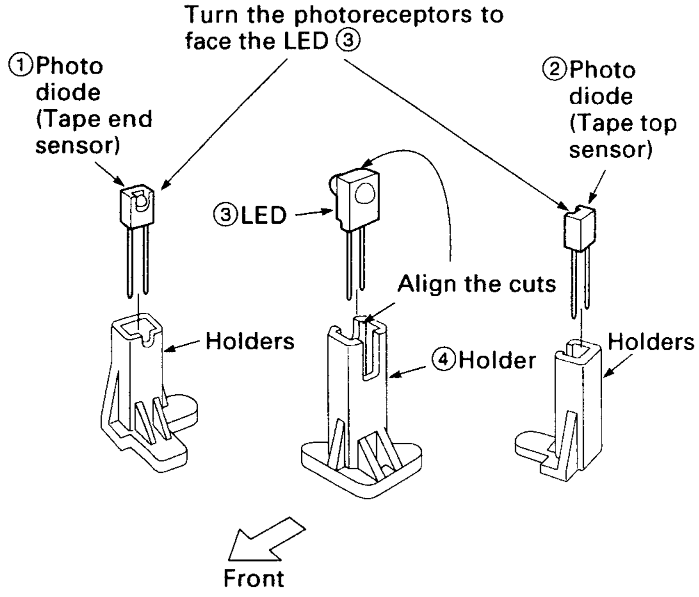
3-18. TAPE SENSORS, REEL SENSOR AND EP SW LEVER

3-18-1.TAPE TOP SENSOR AND TAPE END SENSOR (See Fig.3-18-1)

1) Refer to section 3-2 and remove the mechanism unit.
2) Refer to section 3-3-1 and remove the cassette mechanism assembly.
3) Remove the soldering from the MC-1 PWB assembly, then remove the photo diodes ①, ② and the LED ③. When removing the photo diode ② on the tape top sensor side, refer to section 3-15 and remove the main cam.

ASSEMBLY NOTES:

1. Fit the photo diodes ① and ② so that their photoreceptors to face the LED ③, as shown in Fig.3-18-1. Align the cuts in the LED ③ and the holder ④.
   Push the photo diodes ①, ② and the LED ③ as far down as they will go, so that they do not protrude above the top of their holders.
2. Do the soldering quickly.



Turn the photoreceptors to face the LED ③
①Photo diode (Tape end sensor)
②Photo diode (Tape top sensor)
③LED
Align the cuts
Holders
④Holder
Holders
Front

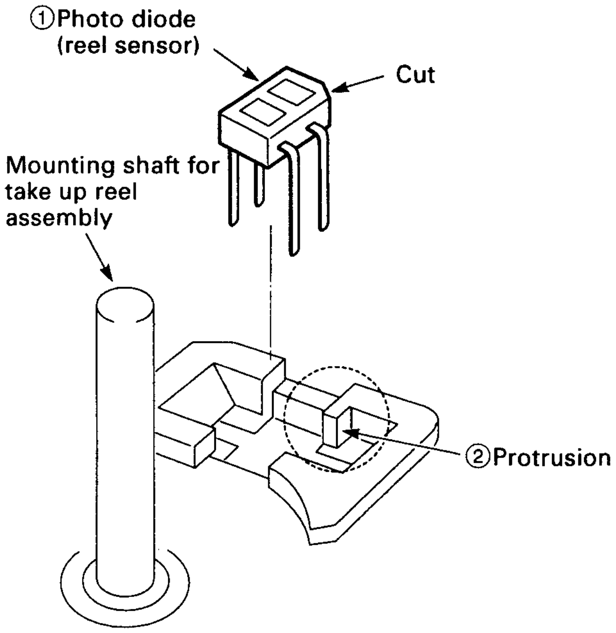
Fig.3-18-1

3-18-2. REEL SENSOR (See Fig.3-18-2)

1) Refer to sections 3-12-2 and 3-12-4, then remove the clutch mounting assembly, the T soft brake assembly and the take up reel assembly.
2) Refer to section 3-13-2, then remove the wheel gear 2, the wheel gear 1, and the brake control lever.
3) Remove the soldering from the MC-1 PWB assembly, then remove the photo diode (reel sensor) ①.

ASSEMBLY NOTES:

1. When assembling the parts, align the cut on the photo diode (reel sensor) ① with the protrusion on the mechanism chassis ②.
2. Do the soldering quickly.



①Photo diode (reel sensor)
Cut
Mounting shaft for take up reel assembly
②Protrusion

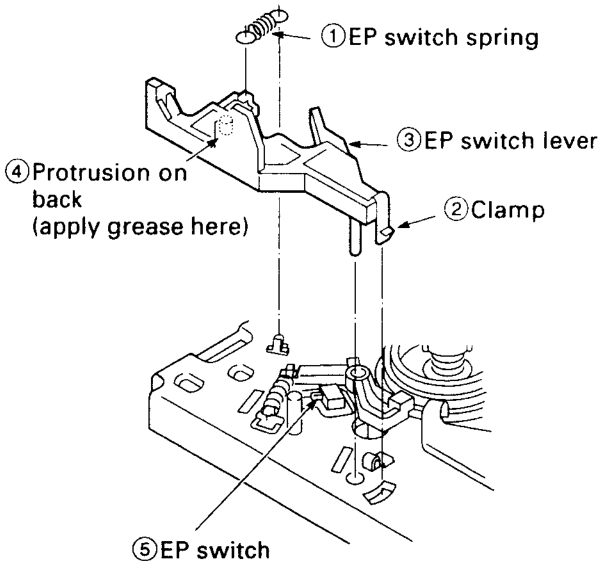
Fig.3-18-2

3-18-3.EP SWITCH LEVER (See Fig.3-18-3)

1) Refer to section 3-3-1 and remove the cassette mechanism assembly.
2) Remove the EP switch spring ①.
3) Remove the clamp ②, then remove the EP switch lever ③.

ASSEMBLY NOTES:

1. Apply grease (VHJ-0100) to the protrusion ④ on the back of the EP switch lever ③.
2. After fitting the cassette mechanism assembly, check that in EJECT mode, the EP switch lever ③ does not touch the EP switch ⑤.



①EP switch spring
③EP switch lever
④Protrusion on back (apply grease here)
②Clamp
⑤EP switch

Fig.3-18-3

4. MECHANISM CHECKS AND ADJUSTMENTS

4-1. REEL TABLE TORQUE CHECK

1)With the power switch turned OFF, stick black vinyl tape over the photo diodes of the tape sensors. Then turn the power switch ON. Front loading will begin. Refer to section 3-2 and Fig.3-2-2, and release the locks of the tray lock lever and the lid opener lever.

NOTES:
1. The measurements must be taken without any incandescent light or daylight.
2. If the mechanism cannot be put into PLAY, FF or REW mode by the method described in 1) above, make a dummy cassette tape, as shown in Fig.4-1-2. The dummy cassette tape is made as follows: Unscrew the five screws on the underside, remove the reels, leaf springs and other parts on the supply and take up sides, make holes in the upper surface as wide as the reel diameter, then assemble the parts.

2) Put the mechanism into REW mode, wait at least 10 seconds, then measure the torque value of the reel table on the supply side. It should be at least 600 g/cm.
   Take the measurement with the torque dial gauge (VHJ-0004) held in position in your hand (lock torque). While taking the measurement, rotate the reel table (take up reel assembly) on the take up side with your hand so that the reel sensor does not respond.
3) After switching to FF mode, wait for at least 10 seconds and then measure the torque value of the reel table on the take up side. It should be at least 600g/cm (lock torque).
4) After switching to PLAY mode, wait for at least 10 seconds and then measure the torque value of the reel table on the take up side. It should be between 80 and 140g/cm (lock torque).

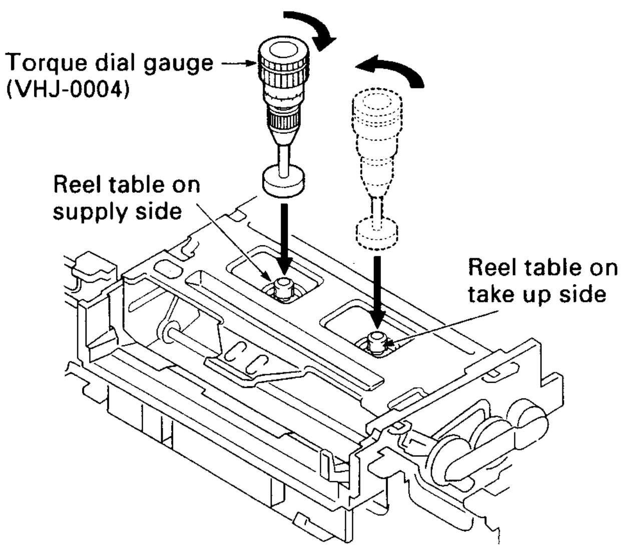

Torque dial gauge
(VHJ-0004)
Reel table on supply side
Reel table on take up side

Fig.4-1-1

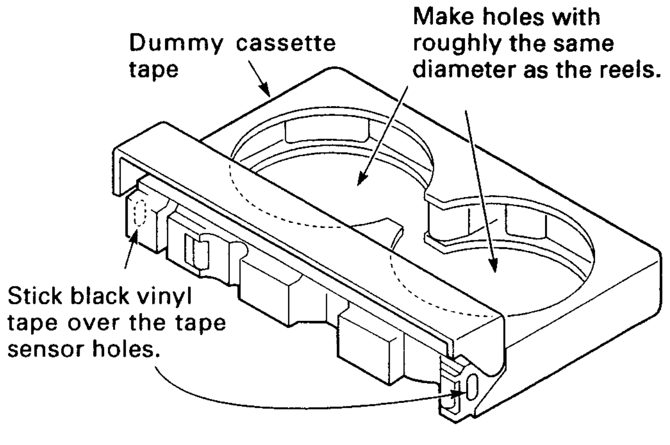

Dummy cassette tape
Make holes with roughly the same diameter as the reels.
Stick black vinyl tape over the tape sensor holes.

Fig.4-1-2

4-2. ADJUSTING THE BT LEVER ASSEMBLY POSITION AND CHECKING THE BACK TENSION TORQUE IN PLAY MODE

4-2-1. BT LEVER POLE POSITION ADJUSTMENT (See Fig.4-2-1)

1) Without loading a cassette tape, put the mechanism into PLAY mode (turn the power switch OFF).
2) Adjust point Ⓐ on the band brake assembly by rotating it so that the tip of the BT lever assembly is aligned with the line on the left side of the mechanism chassis.
3) Refer to section 4-2-2 and check that the back tension torque is between 30 and 50g/cm.

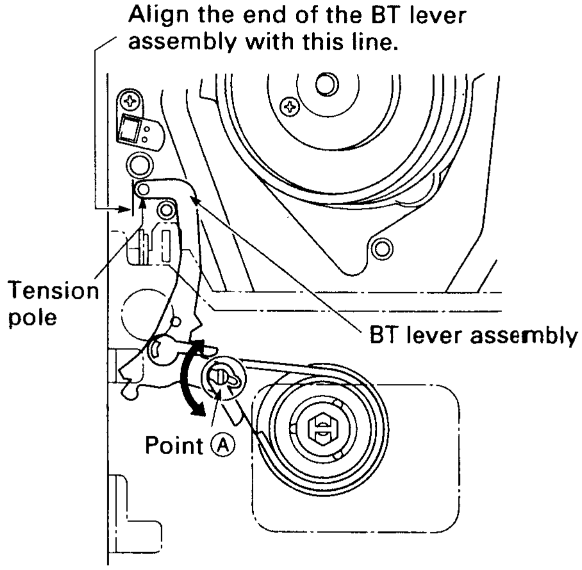

Align the end of the BT lever assembly with this line.
Tension pole
BT lever assembly
Point Ⓐ

Fig.4-2-1

4-2-2. CHECKING THE BACK TENSION TORQUE PLAY MODE

1) Mount the cassette torque meter (VHJ-0016) and switch to PLAY mode.
2) Check that the back tension torque is between 30 and 50g/cm.

4-3. TAPE PATH ADJUSTMENT

In normal circumstances, the tape path system does not need to be adjusted. However, after removing or replacing one of the parts shown in Fig.4-3-1, you should check and adjust the tape path. The adjustment of the tape path is carried out while monitoring the envelope waveform of the video head output, using an oscilloscope. To make sure that the tape drawn off the reel runs freely and without excessive tension along all the tape guides and cylinders (drums), it is also important to check each tape guide by eye.

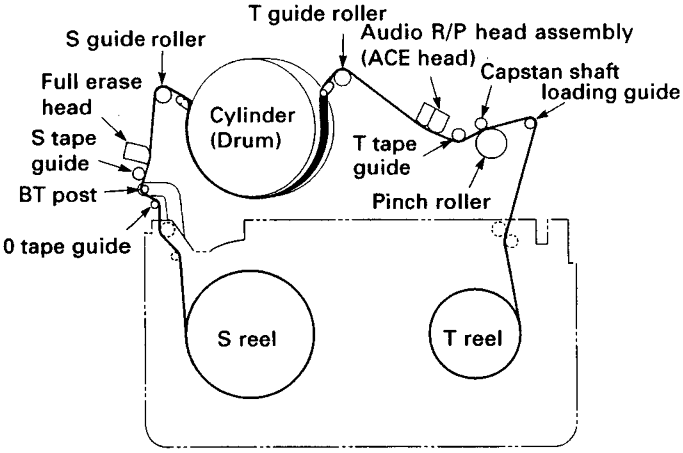


Fig.4-3-1

4-3-1. ADJUSTMENT PROCEDURE

1. Select a PAL or NTSC alignment tape or blank cassette tape, according to the transmission system of the VCR you are repairing.

NTSC: For models with 525 scanning lines and a field frequency of 60Hz

PAL: For models with 625 scanning Ines and a field frequency of 50Hz

2. Clean the tape guides, the cylinder (drum), the capstan Shaft, the audio R/P head (ACE head) and the full erase head.
3. Using an oscilloscope, adjust the height of the guide roller and carry out horizontal position adjustment,height adjustment and azimuth adjustment on the audio R/P head (ACE head). When observing the envelope waveform, bring the CH-1 probe into contact with the envelope waveform test point, and bring the CH-2 probe into contact with the switching pulse (SW P) test point. While adjusting the tape path, set the trigger at the low side of the switching pulse (SW P) in order to observe the output waveform on the CH-1 side of the video head.

NOTE:The contact point for the oscilloscope varies from one model to another, so to find the correct point for your model, refer to the figure entitled "Test point for tape path adjustment" in the electrical circuit section of the service manual.

4. When checking the tape path by eye, use a dental mirror.

4-3-2.LOAD LEVER ASSEMBLY HEIGHT ADJUSTMENT (See Fig.4-3-2)

1. Refer to sections 3-9-2, and remove the opener mounting .
2. Position the height adjustment tool (VHJ-0102) ③ under the full surface of the protrusion ② on the load lever assembly ①, as shown in Fig.4-3-2.
3. Using your fingers, gently screw the adjustment nut ④ clockwise into the nut box (VHJ-0048) ⑤ until the protrusion ② of the load lever assembly ① touches the height adjustment tool (VHJ-0102) ③ and the screw starts to feel tight. Next, loosen the adjustment nut ④ by 270° anticlockwise.
4. Load a cassette tape (NTSC: T-160, PAL: E-240) and switch to PLAY mode. Check that when you do this, no scratches appear on the upper or lower edges of the tape. If scratches do appear, re-adjust the height.

Arrange the equipment so that the whole surface of the projection on the load lever assembly is positioned over the height adjustment tool (VHJ-0102) when seen from directly overhead.

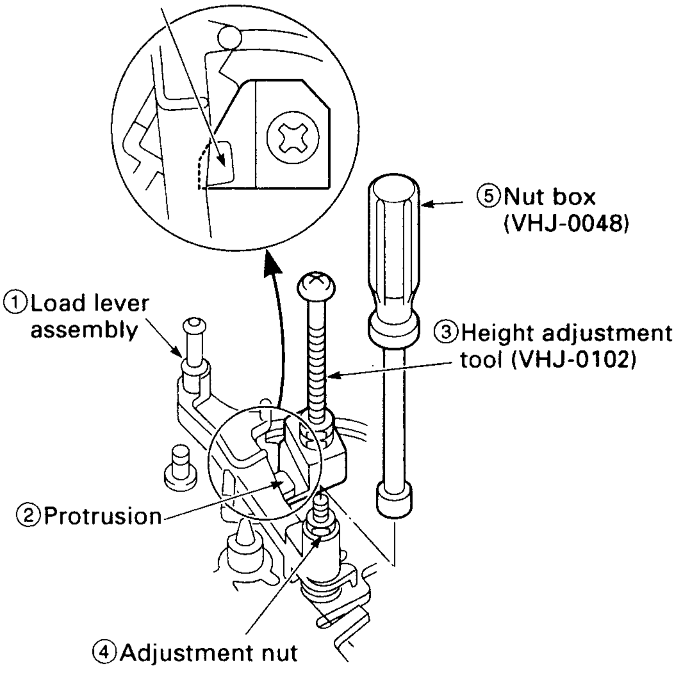


Fig.4-3-2

4-3-3. GUIDE ROLLER HEIGHT ADJUSTMENT (See Figs.4-3-3 and 4-3-4)

1) Play the Alignment Tape (NTSC: VHJ-0006, PAL: VHJ-0009) and check that the envelope waveform is at its maximum at the tracking centre. Then, after loosening the S guide roller and the T guide roller by rotating them anticlockwise, tighten them in turn until the envelope waveform becomes flat. If the envelope waveform is not at its maximum at the tracking centre, refer to section 4-3-4 and carry out a rough adjustment of the horizontal position of the audio R/P head (ACE head) before adjusting the guide rollers.
2) Adjust the S guide roller.
   ① Press the tracking button (Channel –), and check whether, when the envelope waveform has reached 50% of its maximum, the front half of the envelope waveform is flat. If not, fine-tune the S guide roller as follows.
   a. If the front half of the envelope waveform is as shown in Fig.4-3-4 (a), this means that you have pressed the S guide roller too far. Therefore, loosen it slightly, and when it is in the state shown in Fig.4-3-4 (b), tighten it again, stopping when the envelope waveform is flat.
   b. If the front half of the envelope waveform is as shown in Fig.4-3-4 (b), this means you have not pressed the S guide roller far enough. Therefore, tighten it slightly, stopping when the envelope waveform becomes flat.
   c. If the front half of the envelope waveform is as shown in Fig.4-3-4 (c), it may happen that when you tighten the S guide roller, the wrapper waveform does not disappear, but sinks into the flat part, as shown in Fig.4-3-4 (d). If this happens, the status shown in Fig.4-3-4 (c) is normal, so loosen the S guide roller, then tighten it again until the envelope waveform is as shown in Fig.4-3-4 (c).
   ② Check that at the tracking centre, the output of the front half of the envelope waveform is not less than 80% of the maximum.
   ③ Rotate the S guide roller 20° anticlockwise.
3) Adjust the T guide roller.
   ① Press the tracking button (channel –) and check whether, when the envelope waveform is 50% of maximum, the back half of the envelope waveform is flat. If not, loosen the T guide roller slightly, then tighten it gradually until the back half of the envelope waveform becomes flat.
   ② Check that the output for the back half of the envelope waveform is at its maximum at the tracking centre.
4) Check that the envelope waveform does not fluctuate when you switch from F-SEARCH to PLAY or from R-SEARCH to PLAY. If it does fluctuate, repeat steps 3) and 4).

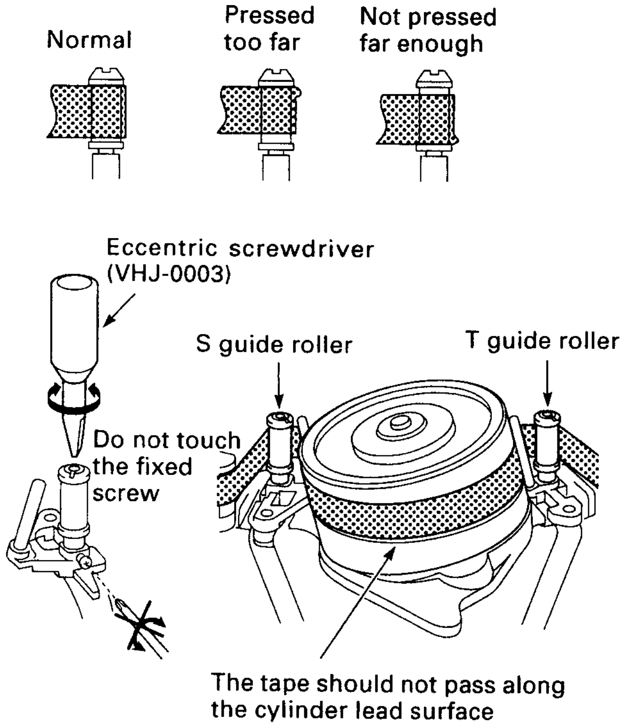
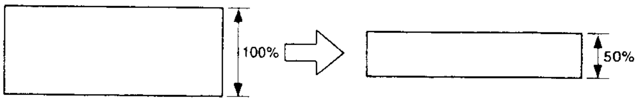

Normal
Pressed too far
Not pressed far enough
Eccentric screwdriver (VHJ-0003)
S guide roller
T guide roller
Do not touch the fixed screw
The tape should not pass along the cylinder lead surface

Fig.4-3-3

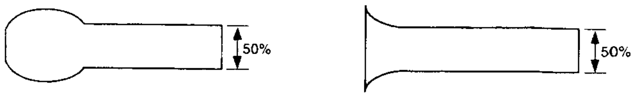
If the envelope waveform is at maximum at the tracking centre, adjust to flat.

In normal status, the waveform will be flat even when the envelope waveform is reduced to 50%.



(a) S guide roller pressed too far

(b) S guide roller not pressed far enough



(c) Normal status for wrapper waveform

(d) S guide roller pressed too far

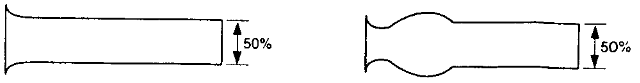


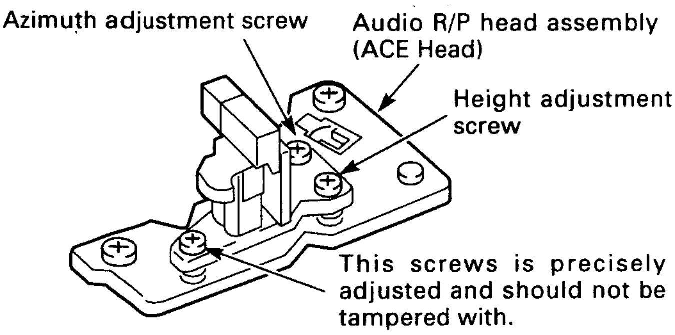
Fig.4-3-4

4-3-4. AUDIO R/P HEAD (ACE HEAD) HEIGHT ADJUSTMENT, AZIMUTH ADJUSTMENT AND HORIZONTAL POSITION ADJUSTMENT

(1) Azimuth adjustment (See Fig.4-3-5)

1) Play the alignment tape (NTSC: VHJ-0005, PAL: VHJ-0008) and observe the waveform of the audio output, using an oscilloscope.
2) Loosen the height adjustment screw in the counterclockwise direction and decrease the amplitude of the audio output waveform. In this state, tighten the screw in the clockwise direcion and maximize the amplitude. Slightly tighten the screw further in the clockwise direction and decrease the amplitude, and then loosen it slowly in the counterclockwise direcion until the amplitude starts to reach the maximum.
3) Play the alignment tape (NTSC: VHJ-0006, PAL: VHJ-0009) and observe the waveform of the audio output, using an oscilloscope.
4) Set the amplitude of the audio output waveform to maximum by rotating the azimuth adjustment screw.
5) Make sure that the tape edge is running between the top of the audio head and the bottom of the control head. Gaps A and B should be roughly equal.

NOTE:Rotate the adjustment screw with a slotted screwdriver. Do not apply excessive force vertically. As the height adjustment screw also adjusts tilt, rotate it slowly. Do not rotate it excessively. And apart from the this screw, and height adjustmment screw, the screws is precisely adjusted before shipment from the factory, and should not be tampered with. Tampering with these screws can lead to scratching of the tape and other problems.


Azimuth adjustment screw
Audio R/P head assembly (ACE Head)
Height adjustment screw
This screws is precisely adjusted and should not be tampered with.

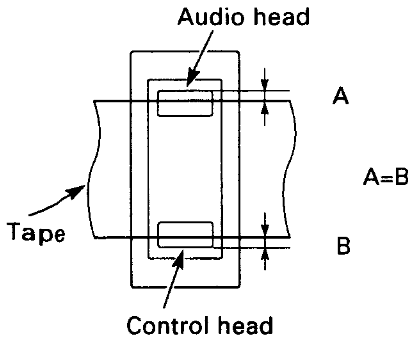


Fig.4-3-5

(2) Horizontal position adjustment (See Fig.4-3-6)

1) Play the alignment tape (NTSC: VHJ-0006, PAL: VHJ-0009).
2) Press the tracking buttons (channel + and channel –) simultaneously and set the tracking to the centre.
3) Using an oscilloscope, observe the waveform of the video head output.
4) Loosen the two fixed screws on the audio R/P head (ACE head) by between 20° and 30° anticlockwise.
5) Using a slotted screwdriver, adjust the position of the audio R/P head (ACE head). At the position where the amplitude of the envelope waveform is at its maximum at the tracking centre, tighten the fixed screw on the audio R/P head (ACE head). When you do this, check that the envelope waveform changes equally whether the tracking is shifted by pressing the tracking button in the plus or the minus direction.
6) Play the alignment tape (NTSC: VHJ-0007 PAL: VHJ-0052) and check that the amplitude of the envelope waveform is at its maximum at the tracking centre. If not, repeat steps 1) to 6).
7) Refer to the electrical adjustments section of the service manual, and adjust the switching position of the servo circuit.

NOTE:

1. When you press the tracking buttons (channel + and channel –) simultaneously, the tracking is reset to the tracking centre. When the tracking is at the tracking centre, the message "T - : - " will appear in place of the clock display on the front panel. If you keep pressing the channel – button the messages "T -: " and "T - -: " will appear, while if you keep pressing the channel + button, the messages "T : -" and "T : - - " will appear. Three seconds after you stop pressing the tracking buttons, the clock display will re-appear.
2. The check described in paragraph 6) is not necessary for models in which the only tape speed is SP mode.

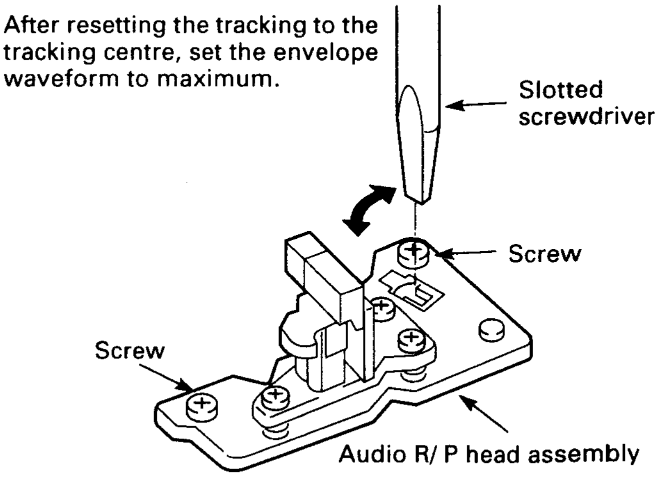

After resetting the tracking to the tracking centre, set the envelope waveform to maximum.
Slotted screwdriver
Screw
Screw
Audio R/ P head assembly

Fig.4-3-6

4-3-5. CHECKING AFTER ADJUSTMENT

1) Play the alignment tape (NTSC: VHJ-0006, PAL: VHJ-0009) and check that the envelope waveform is activated immediately and that there are no fluctuations in the envelope waveform or the audio output waveform.
2) Load a cassette tape (NTSC: T-120, PAL: E-180) and use it to record and replay. Check that the envelope waveform is activated immediately and that there are no fluctuations in the envelope waveform or the audio output waveform. (When recording on the tape, input 1kHz to the audio input terminal. Use a scratch-free cassette tape (NTSC: T-120, PAL: E-180).) Check that at the tracking centre, the front half down and back half down are not more than 20% of the value at the point where the envelope waveform amplitude is at its maximum.
3) Check that the envelope waveform is activated immediately when you switch from PLAY to R-SEARCH or from R-SEARCH to PLAY. Check that there is no slack in the tape next to the pinch roller.
4) Check that the envelope waveform is activated immediately when you switch to PLAY from FF, REW, F-SEARCH, R-SEARCH or STOP mode. Check that there is no slack in the tape next to the pinch roller.
5) Check that the tape is not curling or riding up on the upper or lower flanges of the tape guides in PLAY, FF, REW, F-SEARCH or R-SEARCH modes.
6) Check that in PLAY mode, the tape runs as shown in Fig.4-3-7.
7) Load a tape (NTSC: T-160, PAL: E-240) and play it back. carry out the checks described in steps 3) to 5) above.

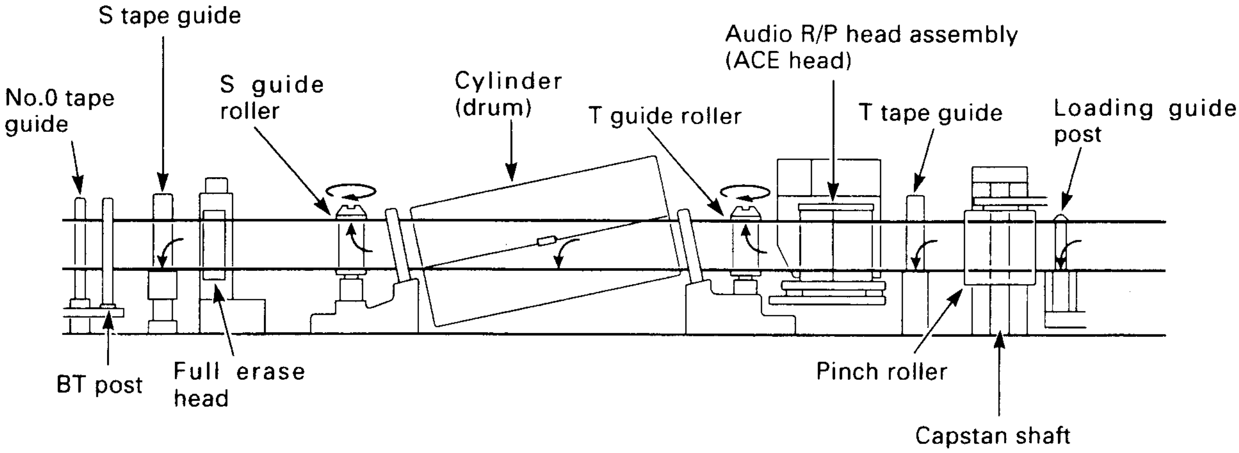

S tape guide
No.0 tape guide
S guide roller
Cylinder (drum)
T guide roller
Audio R/P head assembly (ACE head)
T tape guide
Loading guide post
BT post
Full erase head
Pinch roller
Capstan shaft

Fig.4-3-7